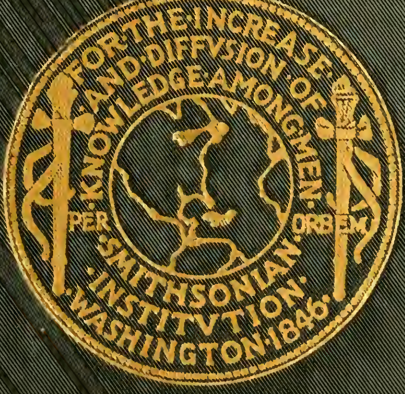
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SMITHSONIAN INSTITUTION
UNITED STATES NATIONAL MUSEUM
BULLETIN 180

FISHES OF THE PHOENIX AND SAMOAN ISLANDS COLLECTED IN 1939 DURING THE EXPEDITION OF THE U. S. S. "BUSHNELL"

By

LEONARD P. SCHULTZ

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The present work forms No. 180 of the *Bulletin* series.

Alexander Wetmore,
Assistant Secretary, Smithsonian Institution.

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FISHES OF THE PHOENIX AND SAMOAN ISLANDS COLLECTED IN 1939 DURING THE EXPEDITION OF THE U. S. S. "BUSHNELL"

By Leonard P. Schultz

ITINERARY

In 1939, through the courtesy of the United States Department of the Navy, I was detailed by the National Museum as naturalist on the Navy Surveying Expedition to the Phoenix and Samoan Islands. We left San Diego, Calif., on the U. S. S. *Bushnell* on April 1 and arrived in Pearl Harbor, Honolulu, on April 11 enroute to the Phoenix Islands.[1]

Between San Diego and the Hawaiian Islands several attempts were made with a submarine light to attract invertebrates and fishes, but the only important capture was some small specimens of Pacific saury (*Cololabis saira* Brevoort) half and two-thirds the way to Hawaii.[2] Although a few specimens were taken in San Diego and at Oahu and some flyingfish enroute, serious collecting did not begin until April 23, in the lagoon of Canton Island, of the Phoenix group.

Canton Island is a coral atoll 4 or 5 miles wide and 9 miles long, with a large lagoon well supplied with coral growth. On the leeward side are two channels, a deep one near the radio stations and a wide shallow channel with exposed reef at low tide to the north. At extreme tides of 3 to 4 feet the water flows out the deep channel at the rate of several miles an hour. In the lagoon fishes and invertebrates abound, but because of the coral heads their capture with nets is difficult.

On April 30 the *Bushnell* arrived off McKean Island, latitude 3°35′S., longitude 174°6′W. This island is about 15 feet above the sea and has practically no vegetation. There are the remains of some stone walls, perhaps abandoned huts, and a pole stands up off a mound of rocks. Birds occur there in countless numbers, flying over like swarming honeybees. Various members of the crew of the *Bushnell* caught yellowfin tuna, barracuda, a rainbow runner, carangids, and red snappers off the reef of McKean Island.

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[1] Several of the officers and men of the *Bushnell* aided in the collecting in various ways. Among those to whom thanks are due are Comdr. J. M. Lewis, Lt. Comdr. W. B. Coleman, Lt. H. N. Coffin, Lt. J. H. Fortune, Lt. T. D. Shriver, Lt. B. L. Talman, Lt. Comdr. (SC) L. A. Klauer, and especially Comdr. (MC) H. D. Hubbard, who assigned to me as assistants at various times Arthur Petit and Charles Rackliffe, pharmacist mates of the U. S. Navy. Without the cooperation of Dr. Hubbard it would have been impossible to collect so many specimens.

Mrs. Aime M. Awl, artist, U. S. National Museum, has drawn all the figures of the new species.

[2] Copeia, 1940, No. 4, p. 270.

We arrived on Swains Island, latitude 11°03′35″ S., longitude 171°04′24″ W., on May 3 and left again on May 10. The reef around the island is 300 to 500 feet wide and nearly flat, but it has a little elevation at the outer margin, which is deeply channeled so that the reef is well drained at low tide. The channels are 50 to 100 feet long, and the water coming through them spreads fanwise over the reef at low tide. Between the channels the reef is elevated a foot or more and deeply pitted with small holes that are occupied by live sea-urchins, these varying from nearly white to dark purple.

According to records kept by Mr. Jennings, owner of Swains Island, the present population is 154, consisting of 44 girls, 29 boys, 44 men, and 37 women.

Much of the vegetation was introduced from the Samoan, Union, and Gilbert Islands. Because of adequate rainfall, Swains Island is a tropical paradise. The inhabitants live mostly on coconuts, breadfruit, oranges, bananas, pigs, and chickens, supplemented by fish.

Copra, the dried meat of the coconut, is the main product exported from this island. Each man on the island gathers and husks a certain number of coconuts each working day, and the women in the village cut the meat out; it takes about one and one-half minutes to remove the white meat, which is then laid out under a roof to dry. Dried copra is packed and shipped a couple of times each year to Honolulu. The women make mats from the pandanus leaves and strings of beads from the tiny corals picked up on the beach. A fresh-water lake or lagoon occupies the center of the island, around the shores of which lives a small goby.

The night of May 12 I spent on Canton Island, seining fishes in the lagoon; May 13 gave me an opportunity to collect in a small section of the widest shallow channel.

The next day I landed on Enderbury Island through a bad surf and over a rough reef. The reef of this island is 100 to 300 feet wide, and channels and coral heads occur at the outer edge where the waves break with great force. At night, with a flashlight, cowrie shells, spiny lobsters, shovel-tailed and other crabs, certain fishes, and many other species of animals can be found and captured. During the day these creatures hide in the rock crevices. Leaving the island on May 20, I was again on the *Bushnell* caring for specimens and drying plants and bird skins.

On May 23 the *Bushnell* was again off Canton Island, and I had another opportunity to collect fishes in the lagoon until the 26th, when I was back on the ship and enroute to Samoa. On the afternoon of June 1 we entered Pago Pago Bay, where with the help of Frank Taiga, Polynesian, I captured specimens near Tower Rock at the entrance of the bay. There appeared in these collections several species that were not found on the coral atolls. During the next few days I visited Alofau, Pagai, Coconut Point, and Fagasa Bay on Tutuila Island, making valuable fish collections in each place.

Leaving Tutuila Island on June 9, the *Bushnell* arrived in the afternoon off Ofu and Tau Islands, where natives came out to the ship in their outrigger canoes to trade. When they departed, I found and preserved a lizard that was on our ship. The next day I landed on Rose Island.

During the interval from June 9 to 21 I collected specimens on Rose Atoll, chiefly in the lagoon and on the extensive reef. This atoll is the first that has had tide pools exposed at low tide on the reef, and so from them rich collections were made. It is nearly square and less than 2 miles across. On the reef at the east corner is Rose Island, only a few hundred feet in diameter, and at the north corner is Sand Island, which is smaller and lower. Rose Island is about 6 to 9 feet above the sea; the south end of it is composed of coral-shell conglomerate rock, overlaid by coral-shell gravel, and is covered with *Pisonia* trees, while the north end is barren and composed of coral-shell gravel. The island appears to be building up to the northwest end and eroding on the south end. To the east of the island for a few hundred feet are loose slabs of coral-shell conglomerate rock left on the reef, which may have at one time formed part of the island. The large coral "niggerheads" scattered over the reef, however, are not of the same composition as the coral-shell conglomerate rocks of Rose Island but are formed of corals that probably grew at the rim of the island and were broken off by storms, then rolled inward on the reef, where they have now come to rest. That these were once coral heads seems probable, since the original corals are not in the position in which they grew but rest in practically all directions, some almost upside down, others sideways.

From June 21 to 26, while the *Bushnell* mapped the ocean bottom, I had opportunity to care for my extensive collections of fishes, birds, plants, and invertebrates. But on June 27 I went ashore on Tau Island and made a large collection of fishes at Siulagi Point, where several native boys, from the village of Faleasau, helped me. The little boys, 5 to 9 years old, would dive after fish in a cave where the water surged up and down, and if a fish was too big for one to handle, more would go to his rescue, and all would come to the surface with it.

On June 28 we arrived again at Pago Pago Bay but were quarantined because of influenza at the Naval Station, until we left on July 3 for Hull Island. On July 7 I landed on Hull Island through a difficult surf and collected specimens until July 18, when I was again back on the *Bushnell.* Without the use of a small boat no collecting could be done in the lagoon of this island. Hull Island is about 7 miles long, and the north side is broken by several channels, from four of which I collected fishes. The reef, like that around most of the atolls, except Rose, is almost devoid of tide pools, because it is nearly flat, and much of it is smooth as a pavement. In other places it is well drained by channels that penetrate as far as a hundred feet.

Between July 19 and 20 we were in the vicinity of Canton and Enderbury Islands where a few fishes were taken on hook and line and presented to me by Lt. Tom Shriver. On the 21st we started for Pearl Harbor, arriving there the 27th. Until August 4 I spent most of my time at the Bishop Museum in Honolulu, when I left for Washington, D. C., arriving there on August 18.

ICHTHYOLOGICAL RESULTS OF THE EXPEDITION

Although nearly five months were spent away from the National Museum, only 65 days were actually available for collecting specimens; the remainder was used in getting from place to place and in preserving the specimens, which numbered 14,022 fishes and about 3,000 other specimens, consisting of amphibians, reptiles, birds, mammals, various kinds of invertebrates, and rocks.

Among the fishes, 30 new species and subspecies and 6 new genera are herein described, distributed among 18 families, as follows:

- DUSSUMIERIDAE:
  - *Spratelloides atrofasciatus*, new species.
- OPHICHTHYIDAE:
  - *Machaerenchelys phoenixensis*, new species.
  - *Brachysomophis sauropsis*, new species.
- ECHIDNIDAE:
  - *Echidna leucotaenia*, new species.
  - *Uropterygius cantonensis*, new species.
  - *Uropterygius reidi*, new species.
- ECHELIDAE:
  - *Kaupichthys diodontus*, new genus and species.
  - *Muraenichthys fowleri*, new species.
- SYNGNATHIDAE:
  - *Ichthyocampus diacanthus*, new species.
- KUHLIDAE:
  - *Kuhlia salelea*, new species.
  - *Kuhlia petiti*, new species.
- SERRANIDAE:
  - *Epinephelus urodelops*, new species.
- PSEUDOCHROMIDAE:
  - *Aporops bilinearis*, new genus and species.
  - *Pseudochromis jamesi*, new species.
  - *Pseudoplesiops rosae*, new species.

CIRRHITIDAE:
- *Amblycirrhitus hubbardi*, new species.
- *Hughichthys*, new genus.

ACANTHURIDAE:
- *Acanthurus rackliffei*, new species.

POMACENTRIDAE:
- *Abudefduf phoenixensis*, new species.

LABRIDAE:
- *Thalassoma marnae*, new species.

GOBIIDAE:
- *Bathygobius fuscus swainsensis*, new subspecies.
- *Gnatholepis hololepis*, new species.
- *Mahidolia pagoensis*, new species.
- *Oplopomus diacanthus*, new species.

ELEOTRIDAE:
- *Trimma eviotops*, new species.
- *Fagasa tutuilae*, new genus and species.

ECHENEIDAE:
- *Phtheirichthys multiradiatus*, new species.

CALLIONYMIDAE:
- *Dermosteira dorotheae*, new genus and species.

TRICHONOTIDAE:
- *Crystallodytes cookei enderburyensis*, new subspecies.
- *Chalixodytes tauensis*, new genus and species.

BLENNIIDAE:
- *Cirripectes jenningsi*, new species.

SCOPE OF THIS REPORT

This report on the fishes of the Phoenix and Samoan Islands is based on the 14,022 specimens collected by me in 1939 and on other specimens in the National Museum in the same families. From time to time during the past century several individuals have collected fishes that have come to the National Museum. The Wilkes Exploring Expedition about 100 years ago was the first to bring back ichthyological specimens from the Samoan Islands and Hull Island of the Phoenix group. About 1874 or earlier Col. A. B. Steinberger collected numerous species of fishes among the Samoan Islands. These were entered in our catalog in 1875 and reported upon by Streets in 1877. During May and June 1883, Dr. W. H. Jones collected several fishes at Samoa, and six years later (1889) Dr. C. H. White collected a few more. In 1894, or a year or two earlier, Lord Lilford and also the Rev. S. G. Whitmee sent a few fishes to the National Museum.

A large collection received from the Samoan Islands was made by David Starr Jordan and Vernon Lyman Kellogg in 1902, mostly at Apia, Samoa, although they collected numerous species at Pago Pago, Samoa. These collections were reported upon by Jordan and Seale in 1906. Since that time but few fishes from the Samoan Islands have been received. Lt. Richard C. Reed collected a few on January 3, 1921, at Tutuila Island, and Capt. J. P. Ault took some in 1929.

In all, 221 species of fishes were collected on this expedition from the region explored and are represented in the National Museum; 128 of these were not taken in the Phoenix and Samoan Islands by any of the ten collectors mentioned above. They, however, obtained 140 species, in the 64 families herein reported on, not collected by me. It is concluded, therefore, that the piscifauna of the South Pacific Ocean must be much more extensive than at present known, else it would not have been possible to collect so many species not already represented in the National Museum from that region.

From Enderbury, Swains, Rose, McKeans, and Tau Islands no fishes had previously been collected for scientific purposes. Jordan and Kellogg obtained most of their specimens near Apia, Samoa, and not many species had been taken at Pago Pago, Tutuila, or at Canton and Hull Islands. Accordingly the *Bushnell* collecting yielded many new distributional records for fishes; about 900 such are published in this report.

References to the literature of the fishes of Oceania are not included herein, since these have been amply covered by H. W. Fowler in his "Fishes of Oceania" and the supplements. Additional sources of references to the South Pacific fishes may be found in Allan R. McCulloch's 1929–30 "Checklist of the Fishes Recorded from Australia." These as well as Jordan's "Genera of Fishes" and Bleeker's and Günther's important works have been used extensively and in numerous cases the references cited have been copied. Whenever possible, however, the citations were verified from the original publications. Thus it must be understood that this is a report upon a large collection and not a revision or monograph of the fishes of the Phoenix and Samoan Islands.

All the collections listed as having been obtained in 1939 were preserved by me while associated with the U. S. S. *Bushnell* and are reported on for the first time in this bulletin.

When the number of species in a family were sufficiently represented by specimens in the National Museum, keys have been prepared and the characters thought to be of value in distinguishing the various species are described in detail. It was intended to give by means of the keys a description of the species reported on, thus making it unnecessary to describe each species along with the distributional records.

Order ASTEROSPONDYLI

Family GALEORHINIDAE

Genus EULAMIA Gill

Eulamia Gill, Ann. Lyc. Nat. Hist. New York, vol. 7, pp. 401, 409, 1861. (Type, "*Carcharias lamia*" Rafinesque=*Carcharhinus commersonianus* Blainville.)

EULAMIA MELANOPTERA (Quoy and Gaimard)

Carcharias melanopterus Quoy and Gaimard, Voyage autour du monde . . . *Uranie*, Poissons, p. 194, pl. 43, figs. 1–2. 1824.

115286, Canton Island, lagoon, May 24, 1939, 1 specimen.
115287, Hull Island, channel, July 10, 1939, 1 specimen.
115285, Hull Island, channel, July 11, 1939, 1 specimen.

Genus TRIAENODON Müller and Henle

Triaenodon Müller and Henle, Sitzb. Akad. Wiss. Berlin, vol. 2, p. 113, 1837; Syst. Beschreib. Plagiost., p. 55, 1838. (Type, *Carcharias obesus* Rüppell.)

TRIAENODON OBESUS (Rüppell)

Carcharias obesus Rüppell, Neue Wirbelthiere, Fische., p. 64, pl. 18, fig. 2. 1835.

115284, off Enderbury Island, July 16, 1939, 2 specimens, total length about 465 mm., removed from a large female by Arthur Petit and preserved by him. A large male was also caught but not saved.

Order ISOSPONDYLI

Family ALBULIDAE

Genus ALBULA Bloch

Albula Scopoli, Introductio ad historiam naturalem, p. 450, 1777. (No type given; on *Albula* Gronow, Zoophylacii, p. 102, 1763.)
Albula Bloch, *in* Schneider, Systema ichthyologia. . . ., p. 433, 1801. (Type, *Albula conorhynchus*=*Esox vulpes* Linnaeus.)

ALBULA VULPES (Linnaeus)

Esox vulpes Linnaeus, Systema naturae, ed. 10, p. 313, 1758.

115185 and 115187, Canton Island lagoon, May 25–26, 1939, 2 specimens.
115186, Canton Island, reef on oceanside, April 28, 1939, 2 specimens.

Family DUSSUMIERIDAE

KEY TO THE SPECIES OF DUSSUMIERIDAE FOUND IN THE PHOENIX AND SAMOAN ISLANDS

1*a*. Sides with a black lateral band, its width equal to two-thirds diameter of eye, area above and below this white; origin of dorsal nearer to end of snout than to base of caudal fin by a distance equal to diameter of eye; gill rakers 7+1+19 to 21; anal rays 10 or 11; dorsal rays 11 or 12; scales 42 to 44; pectoral 12; axillary scale of pectoral is contained in maxillaries 1½ times; pelvics inserted under middle of depressed length of dorsal or under last quarter of base of dorsal fin; snout squal to eye, and twice in head; head about 4⅕ in standard length, depth about 6.9; length of anal base a little longer than snout and same length as base of dorsal fin; maxillaries extend a short distance behind front of eye; distance from insertion of pectorals to pelvics equal to distance from insertion of pelvics to a point one-third the way along anal fin base; deep notch on inner edge of gill opening near isthmus, a similar notch in opercular apparatus........................ **Spratelloides atrofasciatus**, new species

1*b*. Sides of body without a black lateral band; instead, back is blackish and sides are silvery.

2*a*. Original of dorsal nearer to end of snout than to base of caudal fin by a distance equal to a little more than diameter of eye; anal rays 11 or 12; dorsal 11 or 12; scales said to be 36, but on Kner and Steindachner's figure I count 40 or 41; pectoral 12; pelvics inserted under middle of depressed length of dorsal or under two-thirds the distance along base or dorsal; snout about equal to diameter of eye, and 3⅓ in length of head; head 4 times in standard length; depth 5; length of anal base 1⅓ times snout and shorter than dorsal base; maxillaries extend behind front margin of eye; distance from insertion of pectorals to pelvics equal to distance from insertion of pelvics to a point one-fifth the way along anal base (after Kner and Steindachner, 1866, and Günther, 1909)........**Spratelloides alburnus** (Kner and Steindachner)

2*b*. Origin of dorsal nearer to end of snout than to base of caudal fin by a distance equal to one-half to two-thirds diameter of eye; gill rakers 10 to 13+1+32 to 33; anal rays usually 10, occasionally 9 to 11; dorsal rays 10 or 11; scales 38 to 41; pectoral about 12 or 13; axillary scale of pectoral equal to length of maxillaries; pelvics inserted under middle of depressed length of dorsal or under middle third of base of dorsal fin; snout about equal to eye and about 3⅓ in head; head 3⅘ to 4 in standard length, depth about 6; length of anal base about equal to snout and shorter than dorsal base; maxillaries extend a trifle behind front margin of eye; distance from insertion of pectorals to pelvics equal to distance from insertion of pelvics to a point two-thirds along anal base; color blackish above (greenish to blue in life) sides and belly silvery; inner edge of gill opening near rear of isthmus with a deep notch, a similar notch in opercular apparatus that closes just behind notch at side of isthmus; upper edge of preorbital with a blackish spot; tip of chin blackish, snout with black pigment; mouth and gill cavities with black pigment; peritoneum with scattered black pigment cells.....................**Spratelloides delicatulus** (Bennett)

Genus SPRATELLOIDES Bleeker

Spratelloides BLEEKER. Nat. Tijdschr. Ned.-Indië, vol. 2, p. 214, 1851. (Type, *Clupea argyrotaenia* Bleeker.)

SPRATELLOIDES ATROFASCIATUS, new species

FIGURE 1

Holotype.—A specimen (U.S.N.M. No. 115099) 31.7 mm. in standard length, taken June 5, 1939, by Leonard P. Schultz in rock pools at Fagasa Bay, Tutuila Island, along with one paratype (U.S. N.M. No. 115100), 30.5 mm. in standard length.

Description.—(Based on the holotype and paratype, the only known specimens. Measurements are expressed in hundredths of the standard length. Counts and measurements of the holotype are given first followed by those for the paratype in parentheses.) Length of head 24.0 (24.3); greatest depth of body 14.5 (14.7); diameter of eye 7.3 (7.2); length of snout 7.3 (7.2); distance from tip of snout to rear margin of maxillary 8.8 (9.8); tip of snout to origin of dorsal fin 45.7 (47.5); tip of snout to insertion of pelvic fin 52.1 (53.0); tip of snout to origin of anal fin 79.0 (81.3); length of depressed dorsal 16.4 (16.4); length of base of dorsal fin 9.5 (9.8); length of base of anal fin 9.5 (9.8); distance from insertion of pectoral to insertion of pelvic fins 30.0 (30.2); distance from insertion of pelvic fin to origin of anal 24.3 (26.2); width of interorbital space 2.8 (2.9); dorsal rays 11 (12); anal 11 (10); pectoral 12 (−); pelvic 8 (8); scales 44 (42); gill rakers on first gill arch 7+1+21 (7+1+19); premaxillary bound to snout with a frenum; abdomen appears to be naked along the midline.

Color in alcohol: Sides with a black band ⅔ width of eye extending from upper gill opening to base of caudal fin and joining with a small patch of pigment on base of caudal fin rays above and below the midaxis; above (dorsal) the black lateral band is a white band of nearly same width anteriorly but narrower posteriorly; the middorsal line has a double row or line of black spots from occiput to origin of dorsal, thence irregularly along base of dorsal, continuing behind it as a double row and ending at base of caudal fin; the dorsal row of scales in the white band have very faint, blackish, crescent-shaped lines, one on each scale; below the black lateral band the body is white, except for the midline of abdomen, which has a line of black pigment becoming double along base of anal thence to base of caudal fin; tip of chin and sides of mandibles with black pigment; tip of snout black; supraorbital region with black pigment; peritoneum dusky to blackish; inside of opercular apparatus with numerous black pigment cells.

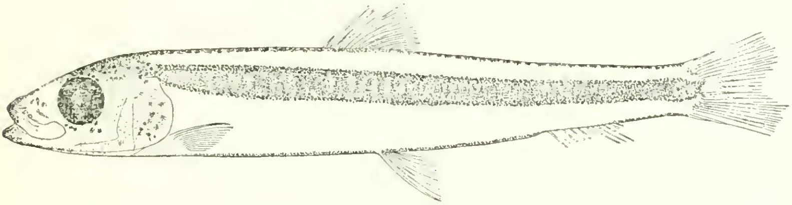

Figure 1.—*Spratelloides atrofasciatus*, new species: Holotype (U. S. N. M. No. 115099), 31.7 mm. in standard length. Scales lost on the types, thus not shown in drawing.

Remarks.—This species differs from other forms referred to the genus *Spratelloides* in having a wide blackish lateral band in connection with other characters.

Named *atrofasciatus* in reference to the black lateral band.

SPRATELLOIDES ALBURNUS (Kner and Steindachner)

Alausa alburnus Kner and Steindachner, Sitzungsb. Akad. Wiss. Wien, math.-nat. Klasse, vol. 54, p. 387, fig. 16, 1866.

No specimens from Phoenix or Samoan Islands in the National Museum.

SPRATELLOIDES DELICATULUS (Bennett)

Clupea delicatula Bennett, Proc. Zool. Soc. London, 1831, pt. 1, p. 168.

The adults attain a standard length of 60 mm.; the females contain nearly ripe eggs.

115102, Canton Island lagoon, April 23 to May 12, 1939, 77 specimens.

115104, Canton Island lagoon, coral heads, May 23–25, 1939, 8 specimens.

115107, Canton Island, seined in channel and lagoon, April 24, 1939, 198 specimens.

115101, Canton Island lagoon, May 25–26, 1939, 315 specimens.

115103, Hull Island channel, July 8–12, 1939, 3 specimens.

115105, Rose Island reef, June 11–14, 1939, 7 specimens.

115106, Hull Island channel, July 7–17, 1939, 16 specimens.

52237, Apia, Samoa, Jordan and Kellogg, 12 specimens.

Order APODES

KEY TO THE FAMILIES OF EELS FROM THE PHOENIX AND SAMOAN ISLANDS REPRESENTED BY SPECIMENS IN THE NATIONAL MUSEUM FROM THAT REGION

1*a*. Body scaly, scales in patches arranged at right angles to adjoining patches; tongue free; pectorals present; origin of dorsal far behind gill openings; dorsal, caudal, and anal well developed, confluent; anus in anterior half of length; posterior nostril in front of eye; teeth small, conical, villiform or in cardiform bands on jaws and vomer; gill openings vertical slits in front of or below base of pectorals________________________ **Muraenidae**

1*b*. Body not scaly.

  2*a*. Dorsal and anal, if present, not reaching tip of tail; the latter is free and projects as a stiff point, caudal fin being absent; posterior nostrils in a slit in or near border of upper lip directed downward, anterior nostrils tubular on under side of snout near its tip; pectorals present or absent; tongue not free, except tip is free in *Brachysomophis*__ **Ophichthyidae**

  2*b*. End of tail not free, but dorsal and anal are confluent with caudal, though all these fins may be rudimentary.

    3*a*. Posterior nostrils lateral or superior, usually on top of head near front of eye, but never in upper lip near eye.

      4*a*. Pectorals absent; gill opening a small lengthwise slit near, above or below, midaxis but not on ventral side; dorsal, anal, and caudal fins confluent, covered with skin (in Phoenix and Samoan Island representatives); tongue not free; anterior nostrils in a tube near tip of snout____ **Echidnidae**

      4*b*. Pectorals present, sometimes small or vestigial; if absent, anus is far behind middle of length and dorsal and anal are confined to tail.

        5*a*. Pectorals well developed; dorsal, anal, and caudal well developed, confluent; anus in anterior half of length; tongue free or not free; branchial openings in pharynx wide slits____________ **Congridae**

        5*b*. Pectorals small, vestigial or absent; dorsal and anal fins confined to tail and sometimes reduced to low folds with visible rays at their ends; anus far behind middle of length; body cylindrical; anterior nostrils tubular near end of snout_______________ **Moringuidae**

    3*b*. Posterior nostrils near eye in upper lip with a valvular flap, directed downward; anterior nostrils tubular near tip of snout and upper lip; pectorals present or absent; anus in anterior half of length; tongue not free____ **Echelidae**

Family MURAENIDAE[3] (ANGUILLIDAE of authors)

KEY TO THE MURAENIDAE FROM THE SAMOAN ISLANDS IN THE NATIONAL MUSEUM

1*a*. Distance from origin of dorsal to a vertical line through anus about equal to head, always more than one-half length of head.

  2*a*. A distinct edentulous groove between outer rows of teeth and an inner row of teeth on both maxillary and dentary; origin of dorsal a trifle nearer gill openings than anus; color somewhat mottled.
  Muraena mauritiana (Bennett)

  2*b*. No edentulous groove on either maxillary or dentary, teeth somewhat compact, villiform; origin of dorsal fin much nearer anus than gill openings; distance from origin of dorsal to a line through anus a little shorter than head; color somewhat mottled.
  Muraena celebesensis (Kaup)

1*b*. Distance from origin of dorsal to a vertical line through anus equal to less than one half length of head; origin of dorsal is over or a little in front of anus; teeth without edentulous groove on either maxillary or dentary.
Muraena australis (Richardson)

Genus MURAENA Linnaeus

Muraena LINNAEUS, Systema naturae, ed. 10, p. 244, 1758. (Genotype, *Muraena anguilla* Linnaeus, type designated by Bleeker, Ned. Tijdsch. Dierk., vol. 2, p. 133, 1865.)

Anguilla SHAW, General zoology, vol. 4, p. 15, 1803. (Type, *Muraena anguilla* Linnaeus, designated by Jordan and Evermann, Genera of fishes, 1917.)

MURAENA MAURITIANA (Bennett)

FIGURE 2, *i*

Anguilla mauritiana BENNETT, Proc. Comm. Zool. Soc. London, p. 128, 1831.

115971, Tutuila Island, creek at Pago Pago, June 6, 1939, 1 specimen, 525 mm.
89809, Samoan Island, Capt. J. P. Ault, 2 specimens.
52423, Apia, Samoa, Jordan and Kellogg, 3 specimens.

MURAENA CELEBESENSIS (Kaup)

FIGURE 5, *a*

Anguilla celebesensis KAUP, Catalogue of the apodal fish in the collection of the British Museum, p. 42, fig. 31, 1856.

52511, Apia, Samoa, Jordan and Kellogg, 1 specimen.

MURAENA AUSTRALIS (Richardson)

Anguilla australis RICHARDSON, Proc. Zool. Soc. London, 1841, p. 22.

52489, Samoa, Jordan and Kellogg, 1 specimen.

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[3] I am using the name "Muraenidae" in this report mostly to bring out the problem in connection with the nomenclature of the group. Unfortunately, Jordan overlooked Bleeker's type designation, which should be considered before this name of the family is rejected.

Family OPHICHTHYIDAE

KEY TO THE OPHICHTHYID EELS FROM THE PHOENIX AND SAMOAN ISLANDS IN THE NATIONAL MUSEUM

1a. Origin of dorsal before gill openings, usually in front half of head; posterior nostrils below front of eye in upper lip and directed downward; tip of lower jaw barely reaching to rear base of tubular anterior nostrils, which are on under side of snout.

2a. Pectorals developed, as long as or longer than diameter of eye; teeth granular, in two rows on dentary and intermaxillary plate, also two rows anteriorly on maxillary and vomer, forming a single row posteriorly--- **Myrichthys Girard**

3a. Color pattern consisting of about 26 to 30 black rings that completely encircle trunk and tail and extend on dorsal and anal fins; greatest width of dark bar at gill opening is contained 0.9 to 1.9 times in width of next pale interspace; there may or may not be round black spots between dark bars that encircle body mostly posteriorly; anus occurs at the twelfth to fifteenth black ring. Following proportions indicate shape of this eel: Head 18 to 20; depth 48 to 62; tip of snout to anus 2.1 to 2.2, all in total length. Eye 1.9 to 2.2 in snout. Depth 2.5 to 3.3; tip of snout to origin of dorsal 2.0 to 2.3; tip of snout to rictus 3.7 to 4.0; length of snout 5.5 to 6.5; length of pectoral 17 to 28; end of dorsal fin to tip of tail 1.2 to 1.7; all in length of head. Anal fin gradually disappears some distance in advance of rear end of dorsal fin. Teeth as in figure.
Myrichthys colubrinus (Boddaert)

3b. Color pattern consists of about 47 or 48 pairs of alternating black spots as counted along dorsal half of body; black spots are smaller ventrally. Following proportions indicate shape of this species: Head 14 to 18; depth 39 and 44; snout to anus 2.4 and 2.5, all in total length. Eye 1.5 in snout. Depth 2.6 and 2.8; tip of snout to dorsal 16.4 and 16.5; snout to rictus 3.3 and 3.5; snout 5.2 and 5.7; rear end of dorsal fin to tip of tail 4.6 to 7.2; length of pectoral 9 and 10.8; all in the head. Teeth as shown in figure----------- **Myrichthys maculosus (Cuvier)**

3c. Color pattern consisting of about 28 to 31 black rings that do not completely encircle trunk and tail, these rings not nearly meeting along ventral side but extending on dorsal fin; greatest width of dark bar or ring at gill opening is contained 2.5 to 4 times in width of next pale interspace; there may or may not be large round dark spots between blackish body rings; proportional measurements essentially same as for *Myrichthys colubrinus.*
Myrichthys semicincta (Bleeker)[3a]

2b. Pectorals undeveloped, gill openings somewhat ventral in position; teeth caninelike or conical, in one series on maxillary and dentary, and in one or two rows on vomer, and one median tooth followed by a pair of similar conical ones on intermaxillary plate--------- **Callechelys Kaup**

4a. Color pattern of a single wide band along middle of body with pale above and below it; margin of dorsal blackish until two head lengths from tip of tail, where this fin becomes pale; anal fin pale; two or three pairs of conical teeth on vomer. Following proportional measurements were made: Head 17; depth 46; tip of snout to anus 1.2, all in the total length. Eye 2.25 in snout. Depth 2.7; tip of snout to origin of dorsal 2.8; snout to rictus 3.57; snout 7.8; and end of dorsal to tip of tail 15.5, all in total length.

[3a] This species is distinct from *M. colubrinus*, and again Bleeker must receive credit for having distinguished the three forms of this type of eel, thrown together by Fowler and others in recent years. *Ophisurus fasciatus* var. *latifasciata* Bleeker (Atlas ichthyologique . . ., vol. 4, p. 64, pl. 165, fig. 1, 1864) is the species currently recognized with the wide black bands around the body and here called *M. colubrinus*. The other form, *Ophisurus fasciatus* var. *oculata* Bleeker, has narrow bands around the body and is undoubtedly the species described by Fowler as *Chlevastes elaps* (Proc. Acad. Nat. Sci. Philadelphia, 1912, p. 13, fig. 3, and Fishes of Oceania, fig. 10). All specimens of *M. semicincta* (Bleeker) observed by me come from the Palmyra Islands.

Callechelys melanotaenia Bleeker

4*b*. Color more or less marbled, black and white areas of about same size behind head, more or less join each other; the head is covered with small black spots; sometimes dorsal fin is blackish along margin and sometimes marbled like body; tail is more uniform blackish posteriorly with margin at tip white; about nine pairs of teeth on vomer. Following proportional measurements were made: Head 16 to 18.6; depth 36 to 52; snout to anus 1.58 to 1.66; all in total length. Eye 1.7 to 2.3 in snout. Depth 2.3 to 2.8; snout to origin of dorsal 2.8 to 3.3; snout to rictus 3.8 to 4.2; snout 7.4 to 8.4; rear end of dorsal fin to tip of tail 8.1 to 11; all in length of head. Tail 1.6 to 1.7 in trunk_ Callechelys marmoratus (Bleeker)

1*b*. Origin of dorsal fin over or behind gill openings; pectoral fin developed.

5*a*. Origin of dorsal fin over gill openings or over pectoral fin; teeth on maxillary and dentary conical, and arranged in a single row but those on vomer not canines or larger than those on intermaxillary plate.

6*a*. Vomer without teeth; color pattern consists of about 25 to 32 black bars meeting their fellows dorsally but not ventrally, except last two or three on tail; these black bars or oval saddles are twice as wide as the pale interspaces along the middorsal line and half as wide ventrally. Proportional measurements as follows: Head 14 or 15; depth about 63; snout to anus 1.9 to 2.1; all in total length. Eye 2.0 to 3.2 in snout. Depth 4.2 to 4.5; tip of snout to dorsal origin 0.89 to 0.98; snout to rictus 3.6 to 3.8; snout 4.9 to 6.3; rear of dorsal to tip of tail 4.5 to 4.9; length of pectoral fin 5.0 to 9.1; all in length of head. Trunk 0.93 to 1.13 in tail.

Leiuranus semicinctus (Lay and Bennett)

6*b*. Vomer with two small teeth; color pattern consisting of 28 wide black saddles in dorsal half of body, ventral half anteriorly plain white or pale, posteriorly these black saddles extend two-thirds to three-fourths down side of body ventrally, last one on tail almost meeting its fellow ventrally; each black saddle is about 4 times wider than narrow pale interspace dorsally. Proportional measurements as follows: Head 16; depth 48; snout to anus 2.46; all in total length. Eye 1.28 in snout. Depth 3; snout to dorsal origin .85; snout to rictus 3.4; snout 6.5; length of pectoral 4.7; end of dorsal fin to tail 4.4; all in the length of the head. Trunk 1.15 in the tail.

Machaerenchelys phoenixensis, new species

5*b*. Origin of dorsal fin one-third length of head behind gill openings; teeth on vomer strong canines in a single row, see figure 2, *h*. Snout 15.5 to 16.3 in head; distance from tip of snout to cross row of pores behind eye 6.7 to 7.2 times in head. Eye in snout 1.09 to 1.3. For additional proportional measurements see table 1.

Brachysomophis sauropsis, new species

Genus MYRICHTHYS Girard

Myrichthys GIRARD, Proc. Acad. Nat. Sci. Philadelphia, 1859, p. 58. (Type, *Myrichthys tigrinus* Girard.)

MYRICHTHYS COLUBRINUS (Boddaert)

FIGURE 2, *a*

Muraena colubrina BODDAERT, Neue Nord. Beytr., vol. 2, p. 56, pl. 2, fig. 3, 1781.

115938, Tutuila Island, reef at Alofau, June 3, 1939, 4 specimens, 221 to 513 mm.

52518, Apia, Samoa, Jordan and Kellogg, 1 specimen.

52275, Apia, Samoa, Jordan and Kellogg, 1 specimen.

43114 (rear half of a specimen), Samoan Islands, A. B. Steinberger.

MYRICHTHYS MACULOSUS (Cuvier)

FIGURE 2, *d*

Muraena maculosa CUVIER, Règne animal, vol. 2, p. 232, 1817 (on *Ophisurus ophis* part, Lacepède, Histoire naturelle des poissons, vol. 2, pp. 195, 196, pl. 6, fig. 2, 1800).

115935, Canton Island, lagoon, May 23–25, 1939, 2 specimens, 300 and 480 mm.

115936, Enderbury Island, reef, May 15–19, 1939, 2 specimens, 156 and 197 mm.

115937, Tutuila Island, reef at Alofau, June 3, 1939, 3 specimens 320 to 410 mm.

Genus CALLECHELYS Kaup

Callechelys KAUP, Catalogue of the apodal fish in the collection of the British Museum, p 51, 1856. (Type, C. *guichenoti* Kaup.)

CALLECHELYS MELANOTAENIA Bleeker

FIGURE 2, *f*

Callechelys melanotaenia BLEEKER, Atlas ichthyologique . . ., vol. 4, p. 66, pl. 193, fig. 2, 1864.

115939, Canton Island, lagoon, April 23 to May 13, 1939, 1 specimen, 595 mm. This eel emerged from coral gravel in about a foot of water at low tide.

CALLECHELYS MARMORATUS (Bleeker)

FIGURE 2, *c*

Dalophis marmorata BLEEKER, Verh. Batav. Genootsch. (Muraen.), vol. 25, p. 37, 1853.

115942, Tutuila Island, reef at Alofau, June 3, 1939, 2 specimens, 450 and 525 mm.

115941, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 2 specimens, 472 and 478 mm.

Genus LEIURANUS Bleeker

Leiuranus BLEEKER, Verh. Batav. Genootsch. (Muraen.), vol. 25, p. 36, 1853. (Type, *L. lacepedei* Bleeker.)

LEIURANUS SEMICINCTUS (Lay and Bennett)

FIGURE 2, *b*

Ophisurus semicinctus LAY and BENNETT, The zoology of Captain Beechey's voyage, p. 66, pl. 20, fig. 4, 1839.

115945, Rose Island, reef, June 11–14, 1939, 2 specimens, 211 and 377 mm.

115943, Tutuila Island, reef at Alofau, June 3, 1939, 60 specimens, 114 to 285 mm.

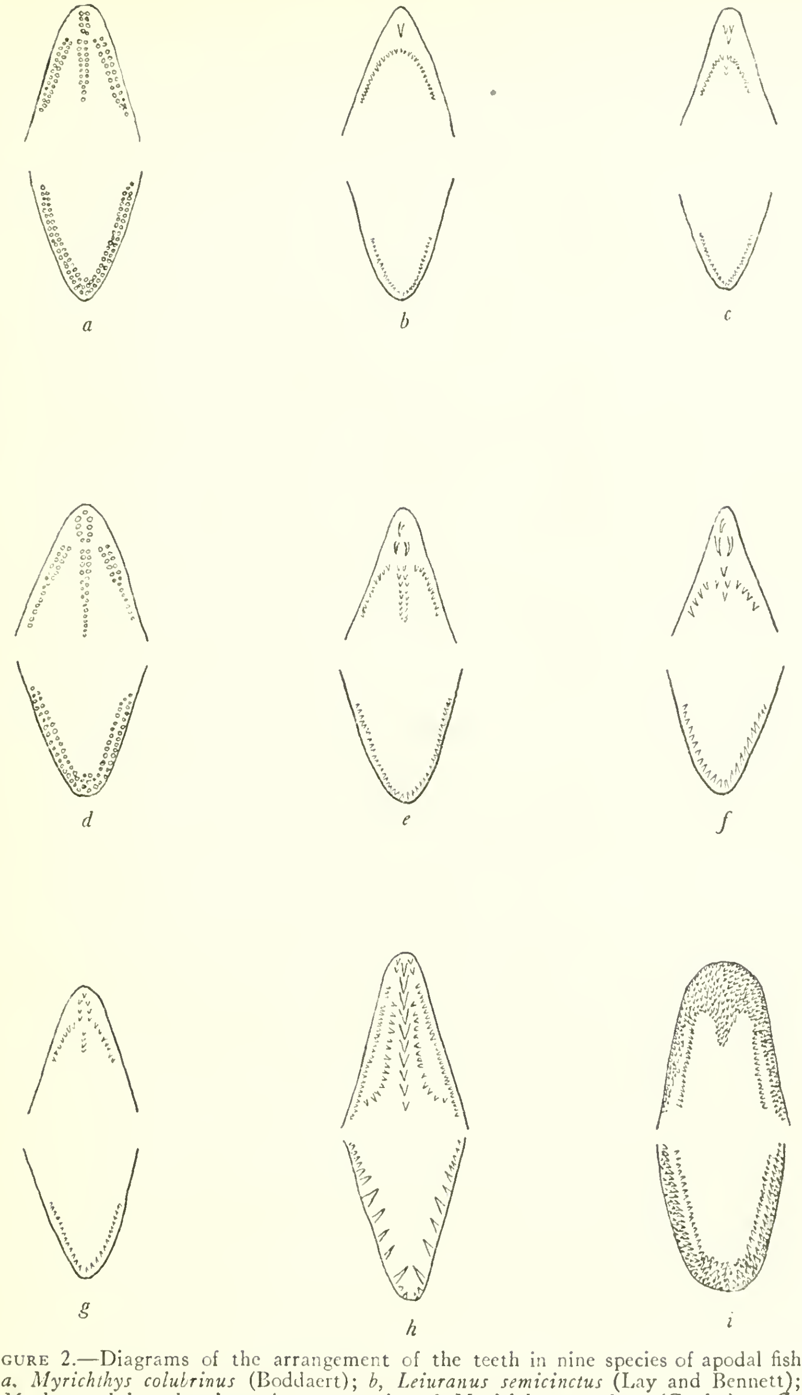


FIGURE 2.—Diagrams of the arrangement of the teeth in nine species of apodal fishes, *a*, *Myrichthys colubrinus* (Boddaert); *b*, *Leiuranus semicinctus* (Lay and Bennett); *c*, *Machaerenchelys phoenixennsis*, new species; *d*, *Myrichthys maculosus* (Cuvier); *e*, *Callechelys marmoratus* (Bleeker); *f*, *C. melanotaenia* Bleeker; *g*, *Moringua microchir* Bleeker; *h*, *Brachysomophis sauropsis*, new species; *i*, *Muraena mauritiana* (Bennett). The number of teeth shown is approximately the number possessed by each species as they were counted. The upper half of each figure represents the upper jaw.

115944, Rose Island, lagoon, June 12, 1939, 14 specimens, 125 to 302 mm.

52297, Apia, Samoa, Jordan and Kellogg, 1 specimen.

52271 (recorded as *Dalophis longipinnis* by Jordan and Seale), Apia, Samoa, Jordan and Kellogg. The specimen in the jar numbered 52271 and identified by Jordan and Seale as *Dalophis longipinnis* (Kner and Steindachner) actually has the dorsal inserted a trifle behind the base of the pectoral fin instead of in front of the gill openings. This, along with no teeth on the vomer and those on the maxillary plain when examined microscopically, indicates that this 75-mm. specimen belongs to *L. semicinctus*, even though it lacks all traces of black spots. Perhaps it recently passed through the usual metamorphosis.

Genus MACHAERENCHELYS Fowler

Machaerenchelys Fowler, Acad. Nat. Sci. Philadelphia, Monogr. 2, pt. 3, p. 85, 1937. (Type, *M. vanderbilti* Fowler.)

This genus is intermediate between *Leiuranus* and *Ophichthys* but differs from the former in having about two conical teeth on the vomer and from the latter genus by lacking a long irregular row, sometimes biserial or triserial, of conical teeth on the vomer.

The teeth on the maxillary and dentary are small and conical and arranged in a single series, as in *Leiuranus*. In this genus the pectoral is developed, the dorsal begins nearly over the base of pectoral fin; the snout projects much beyond the tip of lower jaw, the latter not reaching to rear base of anterior tubular nostrils on under side of snout; posterior nostrils below front of eye in upper lip and directed downward.

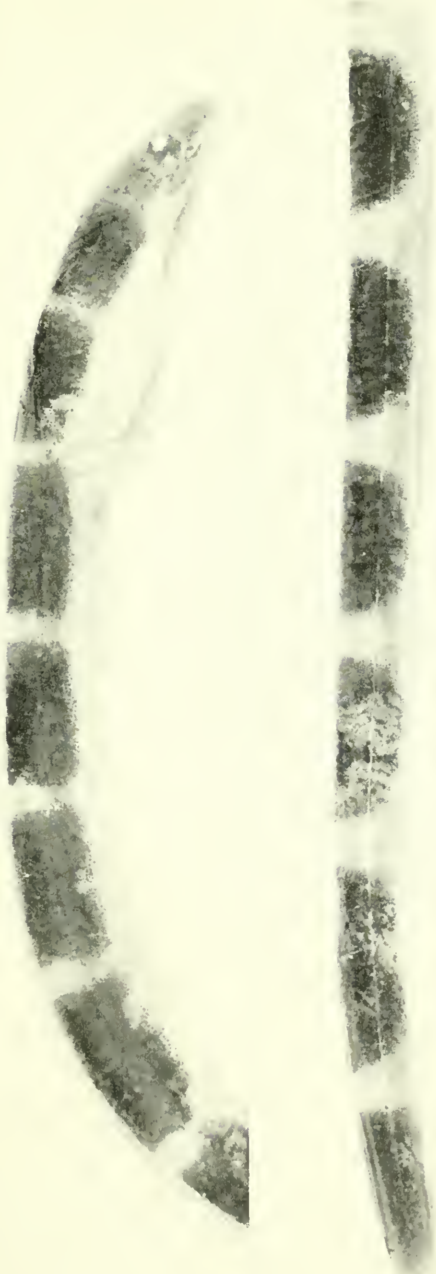
MACHAERENCHELYS PHOENIXENSIS, new species

Plate 1; Figure 2c

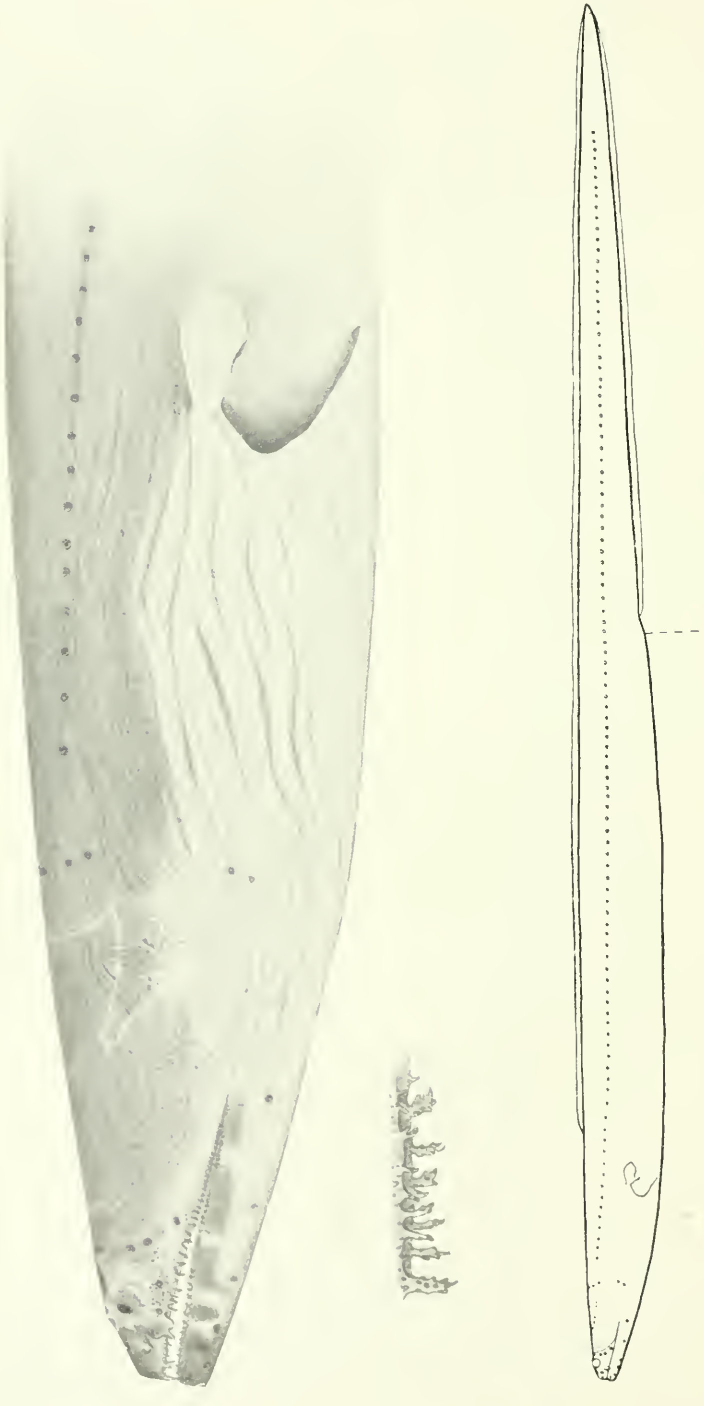
Holotype.—The only known specimen (U. S. N. M. No. 115940), 335 mm. in total length, was taken by Leonard P. Schultz in the lagoon of Canton Island, among coral heads, on May 23–25, 1939.

Description.—(Based on the holotype. Detailed measurements are given in millimeters; these were converted into proportions in the key on page 13). Total length 335; head 21; depth 7; tipe of snout to anus 156; tip of snout to origin of dorsal 23.7; tip of snout to rictus 6.2; snout 3.2; eye 25; end of dorsal fin to tip of tail 4.8; length of pectoral fin 4.5; length of tail 179; width of interorbital 1.6; length of lower jaw 3.5; width of gill opening 1.7; length of 10th black bar 12; and length of 10th pale interspace 2.2 mm. There are 28 black saddles or bars on head and body.

Pectoral rays 12; about 156 pores along the lateral line behind gill opening; on top of snout in front of eye 2 pairs of pores, another pair in interorbital space followed posteriorly by a median pore; 2 pores at rear margin of each eye; 2 below each eye and behind posterior nostril; 1 pore in a line between anterior and posterior



Machaerenchelys phoenixensis, new species: Holotype (U.S.N.M. No. 115940), 335 mm. in total length. Photograph.



Brachysomophis sauropsis, new species: Holotype (U.S.N.M. No. 115946), 573 mm. in total length.

nostrils, and a pair of pores on under side of snout in front of anterior tubular nostrils.

Color consists of pale tip to snout; then a pale brown bar with a narrow pale bar at front of eyes, thence 14 black saddles to the anus, the latter being under the fourteenth, and 14 more behind the anus. The black bars on the trunk extend a little below the lateral line, the ventral part of the body abruptly paler; the bars on the tail have their ventral margins curved and progressively extend nearer the midventral line, the last two almost meeting; tip of tail white. The dorsal and anal fins are pale except where the last black bar extends a little on each fin. The pectoral fin is pale.

Remarks.—This species differs from the only other known species in the genus in the shape and arrangement of the black saddles or bars on the body. An examination of one of Fowler's types shows that the black saddles continue as diffuse pigment areas ventrally to midline of belly. Fowler's drawing indicates a much smaller eye than in *phoenixensis;* the eyes of the latter are a little longer in diameter than the interorbital space and are contained 1¼ in the snout instead of twice as in *M. vanderbilti.*

Named *phoenixensis* in reference to the Phoenix Islands, because it was taken on Canton Island of this group.

Genus BRACHYSOMOPHIS Kaup

Brachysomophis KAUP, Catalogue of the apodal fish in the collection of the British Museum, p. 45, 1856; Arch. Naturg., vol. 22, p. 9, 1856. (Type, *B. horridus* Kaup.)

This genus needs redefining, but the National Museum lacks material for such a study, and during the war it is not possible for me to obtain it. *Brachysomophis horridus* is figured by Kaup and again by Bleeker in his Atlas, plate 10, figure 3, but in both of these figures the shape of the head and snout does not resemble my Samoan Island specimens. The arrangement of the teeth as figured by Bleeker for *horridus* does not agree with my specimen (see fig. 2, *h*). Now *horridus* has been referred to the synonymy of *B. crocodilinus* (Bennett) by authors who have been in a position to examine the specimens in the museums of Europe. Weber and de Beaufort, in their "Fishes of the Indo-Australian Archipelago," define the genus *Brachysomophis* as well as the family Ophichthyidae as having the tongue not free. However, examination of the specimens that I describe as a new species below, as well as the type of *Brachysomophis henshawi* Jordan and Snyder, shows the tip of the tongue to be definitely free. In view of these, and the differences in dentition between the rather vague *crocodilinus*, it seems best to describe as new the specimens collected by me in the Samoan Islands.

BRACHYSOMOPHIS SAUROPSIS, new species

PLATE 2; FIGURE 2, *h*

Holotype.—A female (U.S.N.M. No. 115946) with the body cavity crowded with very small eggs, 573 mm. in total length, taken by Leonard P. Schultz on the reef of Tutuila Island, at Alofau, June 3, 1939.

Two paratypes (U.S.N.M. No. 115947) were taken as follows: A male measuring 462 mm. was collected by L. P. Schultz and a Polynesian boy on the reef of Tau Island, at Siulagi Point as it emerged from a cave, June 27, 1939. This specimen was nearly cut into two pieces by the boy. A third paratype (U.S.N.M. No. 115948), only 178 mm. in total length, was taken by L. P. Schultz and Frank Taiga on the reef of Tutuila Island, at Pagai, June 4, 1939.

Description.—(Based on the holotype and two paratypes. Detailed measurements are given in millimeters; these were converted into proportions in the key on page 13. The measurements for the holotype are given first, followed by those for the paratypes, respectively.) Total length 573, 462, 178; greatest depth of body 34.5, 21.5, 5.5; length of head (tip of snout to upper edge of gill opening) 81, 61.5, 23.6; length of snout 5.2, 3.8, 1.5; diameter of eye 4.0, 3.5, 1.2; tip of snout to rictus 27.8, 22, 7.7; width of bony interorbital space 2.2, 2.5, 0.8; least distance between rows of lateral line pores at rear of head 10.4, 9, 3; length of pectoral fin 9, 6, 2; distance from tip of snout to anus 312, 247, 94; length of tail 261, 215, 84; tip of snout to origin of dorsal fin 105, 82, 33.5; tip of lower jaw to free tip of tongue 23, 16.5, 5.6; tip of snout to cross row of pores near midlength of head 41.3, 34, 12; distance between cross row of pores just behind eyes and those near rear of head 31, 24.8, 8.7; tip of snout to cross row of pores just behind eyes 11.3, 9.2, 3.3.

Between the gill opening and anus there are 52, 51, and 51 pores along the lateral line and 97, 99, and 96 from the gill opening to where the pores end some distance before the end of the tail. The rear part of the eye on the two large specimens is covered with thick skin, and the posterior margin of the eye has several short papillae; outer sides of upper and lower lips have an irregular row of branched papillae; the tip of snout has a papilla each side of the midline, with a black bordered pore above the base; the anterior nostrils, a little nearer eye than tip of snout, are somewhat tubular; above the base of each anterior nostril is a pore and another one between the anterior and the posterior nostril; on top of the head at front of eye is another pore; thus three pairs of pores on the snout; there are two pores under each eye and another at the middle of the upper lip; five or six pairs on lower jaw; also a pair in line with lower jaw a little behind midlength of head; the row of pores behind eyes consists of seven pores, the middorsal one a little in advance of the others at each side; the cross row of pores near midlength of head numbers five, and there are eight pores from this row to the gill opening along the lateral line.

Color brown above, pale below, with each pore on head and along lateral line black-bordered; along the back are scattered numerous black dots; the dorsal fin is white without a black band along its basal two-thirds; the anal and pectoral fins are white.

Remarks.—This new species most closely resembles *Brachysomophis henshawi*, both of which have the teeth on the upper jaw arranged in a different way from that figured for any other species referred to the genus *Brachysomophis*. *B. sauropsis* has a much smaller snout than *B. henshawi*, as it is contained 15½ to 16⅓ times in the head, instead of 9⅖ times; likewise the distance from the tip of the snout to the cross row of pores behind the eye is contained 6.7 to 7.2 times in *sauropsis* and only 4.45 times in *henshawi;* the pores extend a little farther on the tail of *henshawi* than on *sauropsis*. In the former the basal two-thirds of the dorsal fin is black, but in the latter the dorsal fin is pale. In regard to length of snout *B. sauropsis* is the same as for *B. crocodilinus* (=*horridus*), but figures of the head of the latter are much different from *sauropsis* in regard to shape of snout. See table 1.

Named *sauropsis* in reference to its lizardlike appearance around the head, especially the snout.

TABLE 1.—*Proportions computed for two species of* Brachysomophis

Characters	*B. sauropsis*			*B. henshawi*
Total length in mm	573	462	178	492
Number of times in total length:				
Greatest depth	16.6	21.4	32	19.6
Head	7.2	7.5	7.4	7.5
Snout to anus	1.84	1.87	1.89	1.92
Tail	2.2	2.15	2.12	2.08
Snout to origin of dorsal fin	5.7	5.6	5.15	5.4
Number of times in head				
Greatest depth	2.4	2.86	4.3	2.64
Snout	15.5	16.2	16.3	9.4
Mouth	2.9	2.8	3.2	2.96
Least distance between lateral line pores at rear of head	7.8	6.8	8.1	6.0
Length of pectoral fin	9.0	10.2	12.2	8.2
Tip of lower jaw to free tip of tongue	3.5	3.7	4.4	4.46
Snout to cross row of pores at middle of head	1.95	1.8	2.04	1.77
Distance between cross rows of pores: behind eye and middle of head	2.6	2.5	2.8	2.94
Distance from tip of snout to cross row of pores behind eye	7.2	6.7	7.1	4.45
Distance from tip of tail to last pore of lateral line	1.54	1.52	1.2	1.18
Interorbital space in snout	1.82	1.4	1.9	2.03
Eye in snout	1.3	1.09	1.25	1.77

Family ECHIDNIDAE

KEY TO THE GENERA OF ECHIDNIDAE REPRESENTED BY SPECIMENS IN THE NATIONAL MUSEUM FROM THE PHOENIX AND SAMOAN ISLANDS

1*a*. Some of teeth molarlike or granular, usually and at least on vomer; body somewhat compressed; eye small; posterior nostrils on upper surface of head above or before eye______________________________ **Echidna Forster**

1*b*. None of teeth molarlike, even on vomer, although they may be short and conical; anus near middle of length, so that head and trunk are contained less than 1¼ times in tail.

  2*a*. Dorsal and anal fin reduced to rudiments near caudal fin, with which they are confluent; eye small; body rounded or compressed. **Uropterygius Rüppell**

  2*b*. Median fins not reduced to rudiments, dorsal beginning before gill openings and anal fin just behind anus.

    3*a*. Posterior nostrils in a tube longer than tube of anterior nostril. **Murenophis Cuvier**

    3*b*. Posterior nostrils not a long tube as in *Murenophis*.

      4*a*. Anterior nostril tubular near end of snout, with a thickened bilobed projection or flap on posterior distal margin of low tube; posterior nostril larger than pupil, with a raised rim, located in front of upper margin of eye_______________________________ **Enchelynassa Kaup**

      4*b*. Anterior nostril a simple tube without cirri or developed lobes at its tip; posterior nostril near front of eye and about same size as pupil or smaller____________________________________ **Gymnothorax Bloch**

Genus ECHIDNA Forster

Echidna Forster, Icones ineditae, p. 181, 1777. (Type, *Echidna variegata* Forster.)

KEY TO THE SPECIES OF ECHIDNA FROM THE PHOENIX AND SAMOAN ISLANDS

1*a*. Tail (anus to tip of tail) about 2 times in head and trunk (tip of snout to anus); toothed part of vomer pear-shaped, in 6 or 8 or more irregular rows of teeth; dentary with several rows of teeth; body blackish or brownish, with more than 40 white rings. For proportional measurements see table 2____ **Echidna zebra (Shaw)**

1*b*. Tail about equal to or a little longer than head and trunk.

  2*a*. About 24 to 30 white rings on a blackish to brownish background of color, sometimes rings are apparent only posteriorly on large specimens; toothed part of vomer somewhat oblong (more or less pear-shaped on large specimens) with 4 to 6 irregular rows of teeth; dentary with a large inner row of teeth, and with an outer row of smaller teeth of equal length to the inner row___________________________ **Echidna polyzona (Richardson)**

  2*b*. No white rings around body; vomerine teeth in one or two rows (possibly three rows in very large specimens).

    3*a*. Two lengthwise rows of 25 or 30 black starlike blotches with pale centers, the blotches more or less connected with reticulated black lines or fine black spots; in young these black spots have regular edges and lack the white centers; two rows of teeth on vomer, except last two teeth are in midline; one row of teeth on maxillary___ **Echidna nebulosa (Ahl)**

    3*b*. No starlike blotches or black spots on side of body.

      4*a*. Color brownish, with very fine reticulated pale lines in form of an irregular network; dorsal and anal fins as well as snout of same color as rest of body; two rows of teeth at head of vomer becoming

one the rest of its length; two rows of teeth on maxillary; dorsal origin some distance in front of gill opening.
Echidna delicatula (Kaup)

4*b*. Color plain brownish, with dorsal and anal fins white, sharply contrasting with brownish body; snout white, lower jaw white with a brown blotch on it under eye; teeth on vomer in two rows; a short inner row with a longer outer row of teeth on maxillary.
Echidna leucotaenia, new species

TABLE 2.—*Proportional measurements for certain species of* Echidna *from the Phoenix and Samoan Islands*

Characters	*polyzona*		*nebulosa*	*delicatula*	*leucotaenia*	*zebra*
Total length in mm	385	255	280	140	200	635
Number of times in total length:						
Head	7.1	7.5	9.3	8.5	7.8	9.3
Depth	12.7	15	19.3	16	20	18.6
Snout to anus	2.08	2.3	2.0	2.0	2.36	1.48
Number of times in head:						
Depth	1.8	2.0	2.07	1.87	2.55	2.0
Snout	6.3	6.2	6.3	5.0	5.8	6.5
Mouth	2.8	2.84	2.9	3.05	2.7	2.8
Snout to dorsal	1.03	1.23	1.13	1.1	1.19	0.78
Eye in snout	1.7	1.4	1.7	2.0	1.75	1.6
Tail in head and trunk	.92	.9	1.0	1.0	.74	2.1
Number of rows of teeth on the vomer	3 or 4 to 6	3 to 6	2 with last 1 or 2 teeth in midline	2 at head, 1 posteriorly	2 with last 1 or 2 teeth in midline	6 or 8

ECHIDNA ZEBRA (Shaw)

Gymnothorax zebra SHAW, Nat. Misc., vol. 9, pl. 322, 1797.

52314 (3 specimens out of the 4 under this number were wrongly identified by Jordan and Seale; they are placed with *E. polyzona* and have been given a new number), Apia, Samoa, Jordan and Kellogg, 1 specimen, 635 mm.

83373, Samoa, Wilkes Exploring Expedition, 1 specimen.

ECHIDNA POLYZONA (Richardson)

Muraena polyzona RICHARDSON, The Zoology of the voyage of H. M. S. *Sulphur*, Fishes, p. 112, pl. 55, figs. 11–14, 1844.

34810, Apia, Samoa, May 12, 1883, W. H. Jones, 2 specimens.

118169, Apia, Samoa, Jordan and Kellogg, 3 specimens.

ECHIDNA NEBULOSA (Ahl)

Muraena nebulosa Ahl, Specimen ichthyologicum de Muraena et Ophichtho (Thunberg), p. 7, pl. right fig., June 1789.

115965, Canton Island, lagoon, May 23–25, 1939, 2 specimens, 275–290 mm.

115962, Canton Island, reef of widest shallow channel, May 13, 1939, 2 specimens, 97 to 110 mm.

115958, Tutuila Island, reef at Alofau, June 3, 1939, 1 specimen, 79 mm.

115961, Canton Island, reef at ocean, April 25–28, 1939, 14 specimens, 72 to 268 mm.

115963, Tau Island, reef at Siulagi Point, June 27, 1939, 1 specimen, 108 mm.
115964, Swains Island, reef, May 3–9, 1939, 9 specimens, 84 to 252 mm.
115959, Rose Island, lagoon, June 12–20, 1939, 7 specimens, 52–70 mm.
115966, Enderbury Island, reef, May 15–19, 1939, 2 specimens, 158–179 mm.
115960, Rose Island, reef, June 11–14, 1939, 2 specimens, 135 and 565 mm.
52317, Apia, Samoa, Jordan and Kellogg, 3 specimens.
56985, Apia, Samoa, Jordan and Kellogg, 3 specimens.

ECHIDNA DELICATULA (Kaup)

Poecilophis delicatulus Kaup, Catalogue of the apodal fish in the collection of the British Museum, p. 102, 1856.

51714 (3 types of *Echidna trossula* Jordan and Seale), Apia, Samoa, Jordan and Kellogg.
52455, Apia, Samoa, Jordan and Kellogg, 6 specimens.

ECHIDNA LEUCOTAENIA, new species

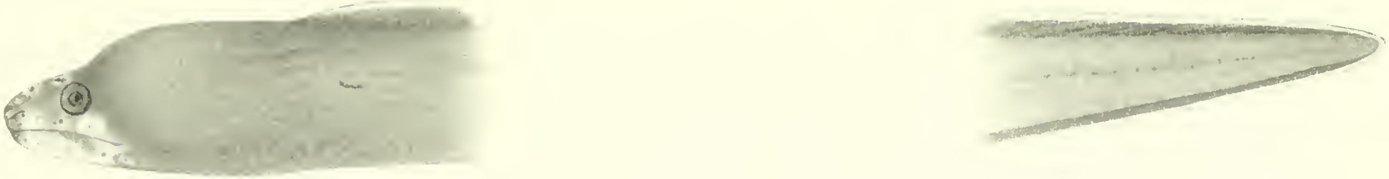
Plate 3

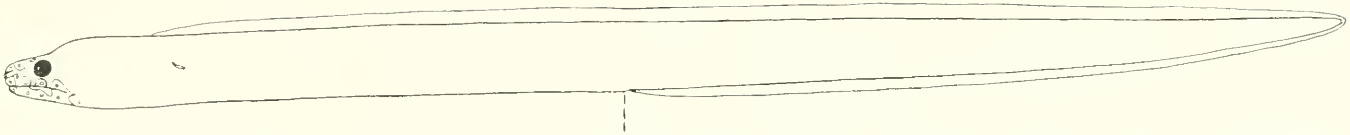
Holytype.—A specimen 229-mm. in total length (U.S.N.M. No. 115949) taken by Leonard P. Schultz on the reef of Enderbury Island, May 15–19, 1939, along with 21 paratypes (U.S.N.M. No. 115950) from 54 to 223 mm., with same data.

Additional paratypes were collected by L. P. Schultz as follows: 3 (U.S.N.M. No. 115955), 90 to 172 mm., were taken July 7–17, 1939, in a channel of Hull Island; a 200-mm. specimen (U.S.N.M. No. 115951) was taken July 8-12, 1939, in a channel of Hull Island; 2 (U.S.N.M. No. 115954), 81 and 110 mm., were taken on the reef of Rose Island, June 11–14, 1939; 2 (U.S.N.M. No. 115956) were taken on the reef of Swains Island, May 3–9, 1939, and measure 77 and 94 mm. in total length; 2 (U.S.N.M. No. 115952), 73 and 96 mm., were taken on the outer reef of Canton Island, April 25–28, 1939; 3 (U.S.N.M. No. 115953), 44 to 49 mm., were taken in the lagoon of Rose Atoll, June 12–20, 1939; 2 (U.S.N.M. No. 115957), 39 and 42 mm., referred to this species with a little uncertainty because of their small size, were taken in rock pools in Fagasa Bay, Tutuila Island, June 5, 1939.

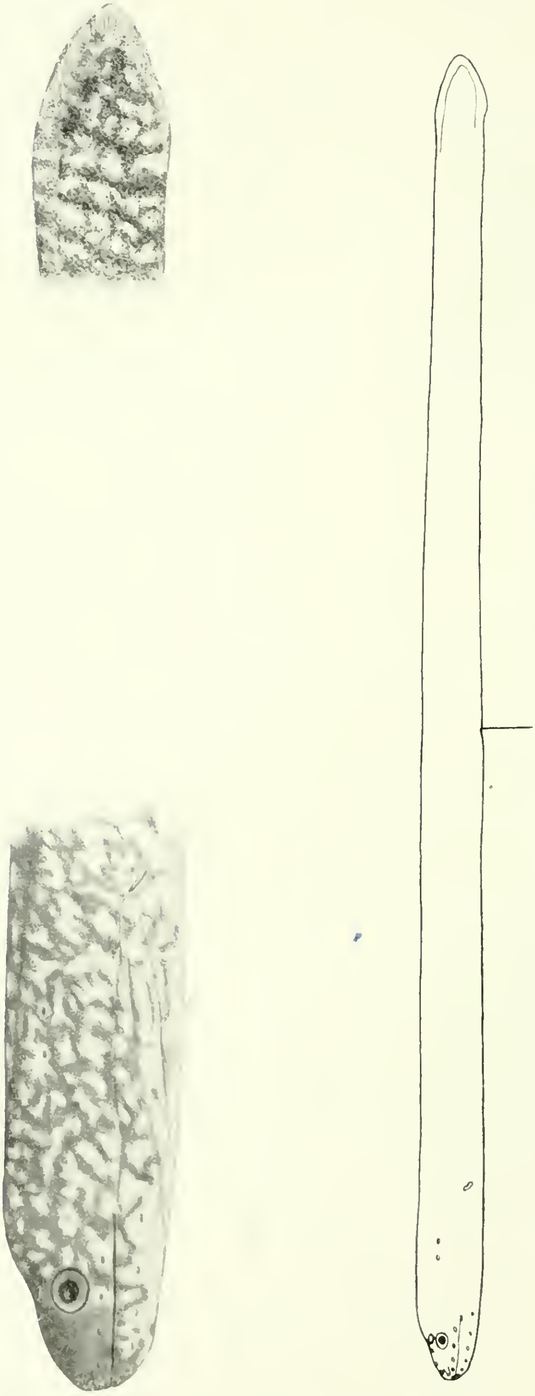
Description.—(Based on the holotype and 36 paratypes listed above. Detailed measurements of the holotype and two paratypes, respectively, are given in millimeters; these were converted into proportional measurements in table 2.) Total length 229, 202, 111; length of head 28.5, 25.5, 12.8; greatest depth 12.0, 10.0, 5.0; length of snout 5, 4.4, 2.2; length of mouth 9.5, 9.5, 4.5; width of fleshy interorbital space 3, 2.7, 1.6; diameter of eye 3, 2.5, 1.5; distance from snout to anus 105, 89, 50; length of tail 124, 113, 61; distance from tip of snout to origin of dorsal 25.3, 21.5, 11.0.

In one paratype there are 126 vertebrae, 80 of these from the anus to tip of the tail. Teeth in upper jaw low, conical, with more or less





Echidna leucotaenia, new species: Holotype (U.S.N.M. No. 115949), 229 mm. in total length.



Uropterygius cantonensis, new species: Holotype (U.S.N.M. No. 115904), 158 mm. in total length.

flattened tips, somewhat molar-shaped, especially on the vomer. The intermaxillary plate has three large teeth in the midline with a row of smaller ones around them; the maxillary has two rows of small teeth anteriorly, the outer one about twice longer than the inner row; vomer with two rows of teeth; dentary with a patch of teeth anteriorly at tip or two irregular rows, the outer row continuing posteriorly and composed of about 13 or 14 teeth; gill openings a horizontal slit a little above the midaxis of the head. Posterior nostrils above front of each eye have a raised, fringed rim, sometimes white; six pairs of pores on lower jaw and five pairs of pores above upper lips, two pairs of pores on front of snout between anterior and posterior nostrils.

Color plain brown; the edges of dorsal and anal fins white, their basal three-fourths or four-fifths brown; snout either all white or just around the pair of pores at upper front of snout, the tip of snout, including tubular nostrils, brownish; upper lip white broken under eye with two brownish lines more or less inclosing some white, these lines extending on the side of the lower lip to form a brownish blotch, the rest of the jaw plain pale or white except for very tip, which has brownish pigment on the lip; the pale lower part of the head gradually changes to brown on the throat. In a specimen 44 mm. long there are two irregular white rings on head behind eye, and a pale area just in front of the gill openings; in a 39-mm. specimen only the tip of the snout is pale, and the edges of the median fins are pale.

Remarks.—This new species differs from all other species of eels referred to the genus *Echidna* in coloration, chiefly the pale areas around the head and the white bands around the edges of the median fins.

Named *leucotaenia* in reference to the white bands around the edges of the median fins.

Genus UROPTERYGIUS Rüppell

Uropterygius RÜPPELL, Neue Wirbelthiere zu der Fauna von Abyssinien gehörig, p. 83, 1835. (Type, *U. concolor* Rüppell, monotypic.)

Anarchias JORDAN and STARKS, in Jordan and Seale, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 204, 1906. (Type, *A. allardicei* Jordan and Starks.)

Anarchias is based on Jordan and Stark's statement that "the dorsal is developed as usual, but entirely lacking the anal fin." My examination of the type, however, indicates that they were in error. There is no dorsal fin as shown in fig. 9, p. 205, by Jordan and Seale, only a fold of skin, without rays. I have dissected this fold of skin on both *A. allardicei* and *A. knighti*, and no rays of any sort occur. If *Anarchias* stands it will be on another character, perhaps on the occurrence of two pairs of nasal openings over the eyes. Herre[4] made the same mistake in connection with *Anarchias reticulatus* Herre.

Scuticaria[4a] also is not a valid genus, as the young and half-grown of *tigrinus* lack tubular posterior nostrils, the character on which the genus was based.

Some of the species that I have referred to the genus *Uropterygius* have not been adequately compared by authors because of the lack of material in various museums, and a few species have been combined with others on grounds that seem unjustified from the material at hand. The following key will be useful in comparing my material with that in other museums. The plates in Bleeker's Atlas are good representations of several of my species as indicated in the key. See also table 3.

TABLE 3.—*Measurements (in millimeters) of specimens referred to species of* Uropterygius *from the Phoenix and Samoan Islands*

Character	*cantonensis*				*allardicei*			*leucurus*		*polyspilus*		*tigrinus*	*fijiensis*
Total length	158	102	166	155	128	103	130	197	115	180	148	815	605
Snout to anus	77	50.5	81	75	57	48	57	88	49.4	83.5	75	525	315
Head	22	12	22.2	21	18	15.2	17.8	21	12.2	17	13	59	60
Snout	3.3	1.9	3.8	3.5	3.2	2.7	2.8	4	2.3	3	2.5	9	8
Greatest depth	7.8	4.5	8.2	8.0	7	5.7	5.6	7.8	4.2	8.7	5.5	31	30
Diameter of eye	2.2	1.2	2.0	1.8	1.6	1.4	1.8	2.0	1.6	1.6	1.2	5.3	3.5
Length of mouth	7.2	5	8	7.2	5.7	4.4	5.9	8.1	5.2	5.8	3.3	19	17
Length of longest midcaudal fin rays	1.1	0.7	1.5	1.5	1.3	1.0	1.3	1.8	0.9	1.0	0.5	2.0	3.0

Character	*xanthopterus*				*concolor*	*micropterus*			*marmoratus*				
Total length	160	225	295	100	150	240	175	125	160	205	355	515	168
Snout to anus	62	91	116	39	67	110	80	57	73	98	155	215	77
Head	16.5	21.5	27.3	9.7	17.4	28	18.5	16.7	23	27	33	51	22
Snout	3	3.7	5	1.9	2.5	4.5	3	3	4.1	5	5.2	7	4.2
Greatest depth	5.3	8.4	12	3.7	6.5	13.5	8.5	6.5	8	11	15.5	24	9
Diameter of eye	1.6	2	2.3	1	1.5	2.1	1.5	1.2	2	2.2	2.6	3.0	1.6
Length of mouth	6.2	8.4	-----	3.5	6	9.4	6.5	5.5	8	9.5	12.4	16	8
Length of longest midcaudal fin rays	2	2.4	3.9	-----	0.5	1.7	1.4	0.6	1	1	(1)	(1)	-----

[1] Completely covered with skin.

KEY TO THE SPECIES OF UROPTERYGIUS FROM THE PHOENIX AND SAMOAN ISLANDS AND OTHER CLOSELY RELATED SPECIES FROM THE SOUTH PACIFIC

1*a*. Posterior nostril not a single opening but divided into two parts, these two openings separated by only a septum or by considerable space (occurrence of septum is most constant and position of extra pore in reference to the posterior nasal opening is also almost invariable).

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[4] Philippine Journ. Sci., vol. 23, p. 230, pl. 9, fig. 3, 1923.

[4a] *Scuticaria* Jordan and Snyder, Proc. U. S. Nat. Mus., vol. 23, p. 886, 1901. (Type, *Ichthyophis tigrinus* Lesson.)

2a. A pair of nasal openings over each eye with considerable space between them, inner pore lies a little forward of larger nasal opening over front part of eye, this pore not to be confused with pair on top of snout a little nearer tip of snout than front of eye; gill openings below level of mouth opening; color brownish mottled with paler, lower jaw pale ventrally, teeth as shown in fig. 3, *a*. Following proportional measurements indicate shape of this eel: Snout to anus 2.02 to 2.06; head 7.2 and 8.5, depth 19.5 to 22.6; all in total length. Snout 5.8 to 6.8; depth 2.6 to 2.8; mouth (snout to rictus) 2.4 to 3.0; length of longest midcaudal fin rays 14 to 20; all in length of head. Eye 1.5 to 1.9 in snout. Head 3.5 and 4.2 in distance from tip of snout to anus______ **Uropterygius cantonensis**, new species

2b. A pair of nasal openings over each eye separated by a septum and not by a definite part of skin of head as in *cantonensis*.

3a. Smaller inner nasal opening lies at anterior part of larger opening over middle of eye; color usually plain brown with pores around head pale or white bordered, two specimens about 130 mm. long, somewhat mottled; teeth as in figure 3, *c*. Following proportional measurements indicate shape of this species: Snout to anus 2.1 to 2.5; head 6.7 to 7.3; depth 18 to 23; all in total length. Head 3.1 to 3.2 in distance from snout to anus. Mouth 3.0 to 3.4; depth 2.6 to 3.2; snout 5.6 to 6.3; and length of midcaudal fin ray 13 to 16; all in length of head. Eye 1.6 to 2 in snout_________ **Uropterygius allardicei** (Jordan and Starks)

3b. Smaller inner nasal opening lies at posterior inner part of larger opening, both over middle of eye; color consists of numerous reticulated or broken irregular, more or less connected, narrow vertical pale brownish bars on sides (brown bars wider than pale interspaces), indistinct in some specimens; sides of lower jaw barred plain and front of throat pale ventrally; a broken brown band on head behind eyes, bordered posteriorly with a pale band, both most distinct in specimens up to 140 mm.; teeth as in figure 3, *b*. Proportional measurements: Head 9 to 9.4; depth 25 to 28; snout to anus 2.2 to 2.4; all in total length. Head 4.0 to 4.2 in distance from tip of snout to anus. Mouth (tip of snout to rictus) 2.3 to 2.6; depth 2.7 to 2.9; snout 5.2; and length of midcaudal fin rays 11.7 to 13.4; all in length of head. Eye in snout 1.5 to 2.
Uropterygius leucurus Snyder

1b. A single pair of posterior nostrils, either with or without a raised rim or elongate tube.

4a. Color of body consisting of brown or blackish spots, their diameter about length of snout or little larger, arranged in about three irregular rows along side of body; in large adults there may be smaller brown specks between large spots; brown spots not in parallel bands on head.

5a. Tip of snout and lower jaw white (probably yellow in life); rest of body with large black spots. Snout to anus 2.0 to 2.1; head 10.6 to 11.4; depth 23½ to 27; all in total length. Head 4.9 to 5.7 in snout to anus. Snout 5.2 to 5.7; depth 2.0 to 2.4; mouth 2.9 to 3.9; length of midcaudal fin rays 17 to 27 all in length of head; eye 1.9 to 2.0 in snout. Teeth as in figure 3, *d*. (Perhaps this is the young of *tigrinus*.)
Uropterygius polyspilus (Regan)

5b. Tip of snout not paler than rest of body; small brown specks among the large brown spots. Proportional measurements from a specimen 815 mm. in total length: Snout to anus 1.6; head 13.8; depth 26; all in total length. Head 8.9 in distance from tip of snout to anus. Snout 6.5; depth 1.7; mouth 3.1; length of midcaudal fin rays 29; all in length of head. Eye 1.7 in snout___**Uropterygius tigrinus** (Lesson)

4*b*. Color pattern not as in 4a but consisting of brown spots in more than three rows on each side of body or mottled or reticulated or plain brownish.

6*a*. Color consisting of five or six irregular rows of brown spots, more or less joined to each other, and about eight or nine somewhat broken lengthwise bands on sides of head. Proportional measurements: Head 10.1; depth 20.3; snout to anus 1.9; all in total length. Head 5.3 in distance from snout to anus. Mouth 3.5; depth 2.0; snout 7.5; length midcaudal fin rays 20, all in length of head. Eye in snout 2.3 (Fig. 3, *f*.)
Uropterygius fijiensis Fowler and Bean

6*b*. No blackish lengthwise bars on sides of head, color pattern mostly plain brown or blackish or reticulated or marbled.

7*a*. Length of midcaudal fin rays contained 7 to 9 times in head. Depth 26 to 30; head 9.7 to 10.8; snout to anus about 2.5; all in total length. Head 4.0 to 4.6 in distance from snout to anus. Mouth 2.6 to 2.8; depth 2.3 to 3.1; snout 5.1 to 5.8; all in head. Color brownish or blackish somewhat mottled or reticulated overlaid with small white specks, as large as pupil on head, smaller posteriorly and fewer in number, becoming obscure on specimens from about 250 to 355 mm., but prominent on specimens from 100 to 200 mm. in total length. Caudal fin pale. Lower jaw reticulated. (Fig. 3, *i*.)
Uropterygius xanthopterus Bleeker

7*b*. Length of middle caudal fin rays short, contained 13 or more times in head; head without definite pale spots (except the pores are often pale on head) and fine white points posteriorly, but either mottled reticulated or plain brown. Depth in length usually fewer than 23 times.

8*a*. Color plain brown, no reticulations or mottlings anywhere; pores around head pale in contrast to plain brown color; posterior nostril not tubular at a length of 200 mm. or smaller. Snout to anus 2.2; head 8.5; depth 23; all in total length. Head 3.3 in distance from snout to anus. Snout 6.9; depth 2.7; mouth 2.9; length of midcaudal fin rays 35; all in length of head. Eye 1.7 in snout. (Fig. 3, *g*.)____________________ **Uropterygius concolor Rüppell**

8*b*. Color not plain brown, either reticulated, barred, or mottled.

9*a*. Gill opening very high on head, above level of nostrils; teeth in five series above and four on lower jaw; posterior nostril not tubular; head 9 to 10½ in total length; reddish dark spots tending to form vertical and lengthwise stripes.
Uropterygius supraforatus (Regan)

9*b*. Gill opening on level or below level of eye; teeth in not over four series on upper jaw, even on specimens 600 mm. or longer.

10*a*. Undulating narrow cross bands broken into spots or light brownish saddles or cross bands fading into plain color ventrally; head 8⅓ to 8½ in total length, teeth triserial or biserial on jaws; trunk shorter than tail; front of eye at middle of length of mouth.

11*a*. Posterior nostril tubular; undulating light-brownish cross bands narrower than paler interspaces.
Uropterygius fasciolatus (Regan)

11*b*. Posterior nostril not tubular; light-brownish cross bands or saddles are most distinct on dorsal half of body and usually almost as wide as paler interspaces; they number about 40 to 43; first cross band borders posterior margin of eye; these cross bands on sides more or less join each other, giving appearance of a row of pale round blotches along midaxis. Trunk 2.19 to 2.37; depth 23 to 32; both in total length. Head 3.5 to 3.7 in trunk. Snout 5.6 to 6.36; depth 2.8 to 4.1; mouth 2.93 to 3.88; length of midcaudal fin rays 19 to 30; all in length of head. Eyes 2.95 to 3.6 in snout__________ Uropterygius reidi, new species

10*b*. Color pattern mottled or reticulated but not arranged into vertical bands; posterior nostril tubular in large specimens but only a raised rim in those 300 mm. and shorter.

12*a*. Trunk longer than tail, tail contained 2⅕ in total length; head 3⅓ in tail and 4 in trunk; color appears to be mottled in Bleeker's figure.
Uropterygius macrocephalus (Bleeker)

12*b*. Tail longer than trunk (snout to anus); thus usually about 1.7 to 1.9 times in total length.

13*a*. Length of midcaudal fin rays 13 to 16 in head; color pattern reticulated, or a network of blackish or brownish lines over a light brownish or pale background of color; under side of head plain pale, as is lower jaw; sometimes the sides of lower jaw have the reticulations; middorsal line with a fold of skin beginning near or on head and resembling a dorsal fin, but no rays appear until near caudal fin. Head 8.6 to 9.4; depth 18 to 21; snout to anus 2.2; all in total length. Head 4.0 to 4.3 in the distance from snout to anus. Mouth 2.9 to 3.0; depth 2.0 to 2.1; snout 6.2; all in length of head. Eye 2.0 to 2.2 in snout. Teeth as in figure 3, *h*. Posterior nostril a rim on specimens from 125 to 240 mm.
Uropterygius micropterus (Bleeker)

13*b*. Length of midcaudal fin rays 23 to 27 times in the head; color pattern not of reticulated lines but mottled, on our shortest specimens of 160 mm. total length. Head 7 to 11; depth 18 to 23; snout to anus 2.1 to 2.4; all in total length. Head 3.2 to 4.3 in snout to anus. Mouth 2.7 to 3; depth 2.1 to 3; snout 5.4 to 6.3; all in head. Posterior nostril a raised rim in small specimens but tubular on large adults 355 mm. and longer. (Fig. 3, *c*.)
Uropterygius marmoratus (Lacepède)

UROPTERYGIUS CANTONENSIS, new species

PLATE 4; FIGURE 3, *a*

Holotype.—A specimen (U.S.N.M. No. 115904) 158 mm. in total length, collected by Leonard P. Schultz in the lagoon of Canton Island, among coral heads, May 23–25, 1939, along with 10 paratypes (U.S.N.M. No. 115905), 102 to 166 mm., with the same data. One paratype (U.S.N.M. No. 115906), 155 mm. long, was taken on the reef of the widest shallow channel of Canton Island, by L. P. Schultz on May 13, 1939, and another (U.S.N.M. No. 115907), 93 mm. long, from the lagoon of Canton Island, April 23 to May 12, 1939.

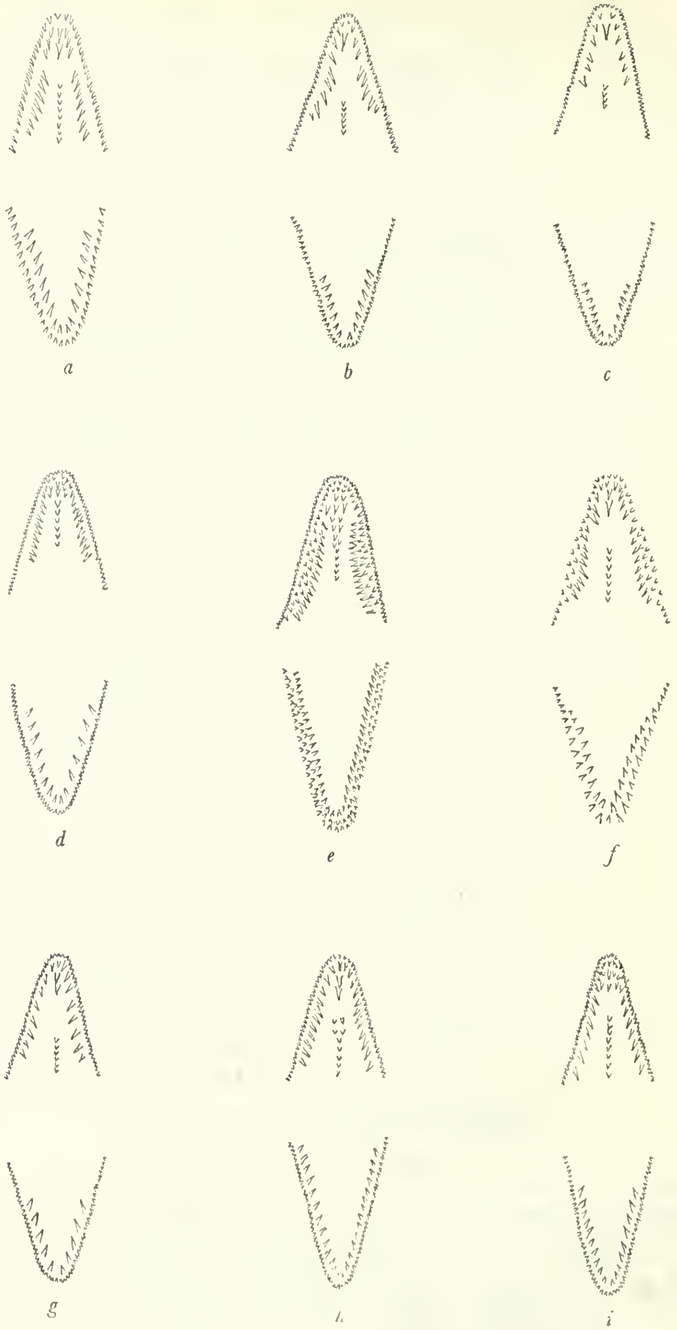


FIGURE 3.—Diagrams of the relative size and arrangement of the teeth in nine species of *Uropterygius: a, U. cantonensis,* new species; *b, leucurus* Snyder; *c, allardicei* (Jordan and Starks); *d, polyspilus* (Regan); *e, marmoratus* (Lacepède) from an adult 540 mm. in total length; *f, fijiensis* Fowler and Bean; *g, concolor* Rüppell; *h, micropterus* (Bleeker); *i, xanthopterus* Bleeker. Upper half of each diagram represents the upper jaw and lower part the lower jaw. The vomerine teeth occur in the center of the upper half of the mouth in the midline.

Description.—(Based on the holotype and 12 paratypes. Detailed measurements of the holotype and 3 paratypes in parentheses are given in millimeters. Proportional measurements are given in the key, p. 25.) Total length 158 mm (102, 166; 155); length of head 22 mm (12; 22.2; 21); length of snout 3.3 (1.9; 3.8; 3.5); diameter of eye 2.2 (1.2; 2.0; 1.8); length from tip of snout to rear corner of mouth where upper and lower jaws meet 7.2 (5; 8; 7.2); least width of fleshy interorbital space 2.9 (1.4; 2.9; 2.7); greatest depth of body 7.8 (4.5; 8.2; 8.0); greatest width or thickness of body 5 (3; 5.5; 5); distance from snout to anus 77 (50.5; 81; 75); length of tail 81 (51.5; 85; 80); length of middle rays of caudal fin 1.1 (0.7; 1.5; 1.5); the width of the space between the pair of nasal openings over each eye 0.3 mm (0.1; 0.5; 0.4).

One paratype has 103 vertebrae.

The teeth on lower jaw are in two series, an outer row of small ones and an inner row of larger canines that extend almost as far back as the outer row; the upper jaw has similar teeth in two rows, the inner row extending back almost as far as the outer; anteriorly there are three irregular rows of canines inside the smaller outer row; the teeth on the vomer are uniserial.

Anterior pair of nostrils tubular, near the bases of which are three pairs of pores; another pair of pores on top of snout about an eye's diameter behind tip of snout; above rear half of each eye is the posterior nostril, with a small pore about the diameter of the nasal opening forward and a little toward the mid-line. Three pores along side of upper jaw behind those on front of snout; six pairs of pores on lower jaw; gill opening in line with or below the opening of the mouth.

Color pattern consisting of a network of reticulated wide blackish or brown lines, which arrange themselves more or less into irregular vertical bars, usually more obvious posteriorly, on a pale or very light brown background; underside of head plain pale; in some specimens the reticulations extend on sides of lower jaw; on some of the smaller specimens occur small pale specks posteriorly. Front margin of eye with black pigment.

Remarks.—This new species differs from all other eels in the genus *Uropterygius* in the pair of openings over each eye separated by skin as wide as or wider than the diameter of the posterior nasal opening, in combination with the color pattern and low position of the gill opening.

Named *cantonensis* after Canton Island, where it was collected.

UROPTERYGIUS ALLARDICEI (Jordan and Starks)

FIGURE, 3, *c.*

Anarchias allardicei JORDAN and STARKS, in Jordan and Seale, Bull. U. S. Bur. Fish., vol. 25, p. 204, fig. 9, 1906.

115919, Canton Island, lagoon, May 23-25, 1939, 1 specimen, 113 mm.

115923, Canton Island, lagoon, April 23 to May 12, 1939, 3 specimens, 92 to 131 mm.

115922, Canton Island, reef of widest shallow channel, May 13, 1939, 1 specimen, 98 mm.

115921, Enderbury Island, reef, May 15-19, 1939, 27 specimens, 57 to 128 mm.

115920, Canton Island, reef at ocean, April 25-28, 1939, 12 specimens, 52 to 130 mm.

115918, Rose Island, reef, June 11-14, 1939, 1 specimen, 81 mm.

51715 (type and paratype of *Anarchias allardicei* Jordan and Starks) Pago Pago, Samoa.

118166, Apia, Samoa, Jordan and Kellogg, 1 specimen.

This is a small species, as some of the females have swollen abdomens and contain eggs that measure as much as 2½ mm. in diameter.

UROPTERYGIUS LEUCURUS Snyder

FIGURE 3, *b*

Uropterygius leucurus SNYDER, Bull. U. S. Fish Comm., vol. 22, p. 521, pl. 6, fig. 12, 1904.

115926, Rose Island, reef, June 11-14, 1939, 12 specimens, 82 to 200 mm.

115924, Enderbury Island, reef, May 15-19, 1939, 6 specimens, 63 to 118 mm.

115925, Tau Island, reef at Siulagi Pt., June 27, 1939, 3 specimens, 64 to 114 mm.

115927, Rose Island, lagoon, June 12-20, 1939, 2 specimens, 115 and 142 mm.

115928, Swains Island, reef, May 3-9, 1939, 8 specimens, 98 to 170 mm.

The type of *Uropterygius leucurus*, U. S. N. M. No. 50871, from Hawaii, has also been studied.

UROPTERYGIUS POLYSPILUS (Regan)

FIGURE 3, *d*

Gymnomuraena polyspila REGAN, Ann. Mag. Nat. Hist., ser. 8, vol. 4, p. 438, 1909.

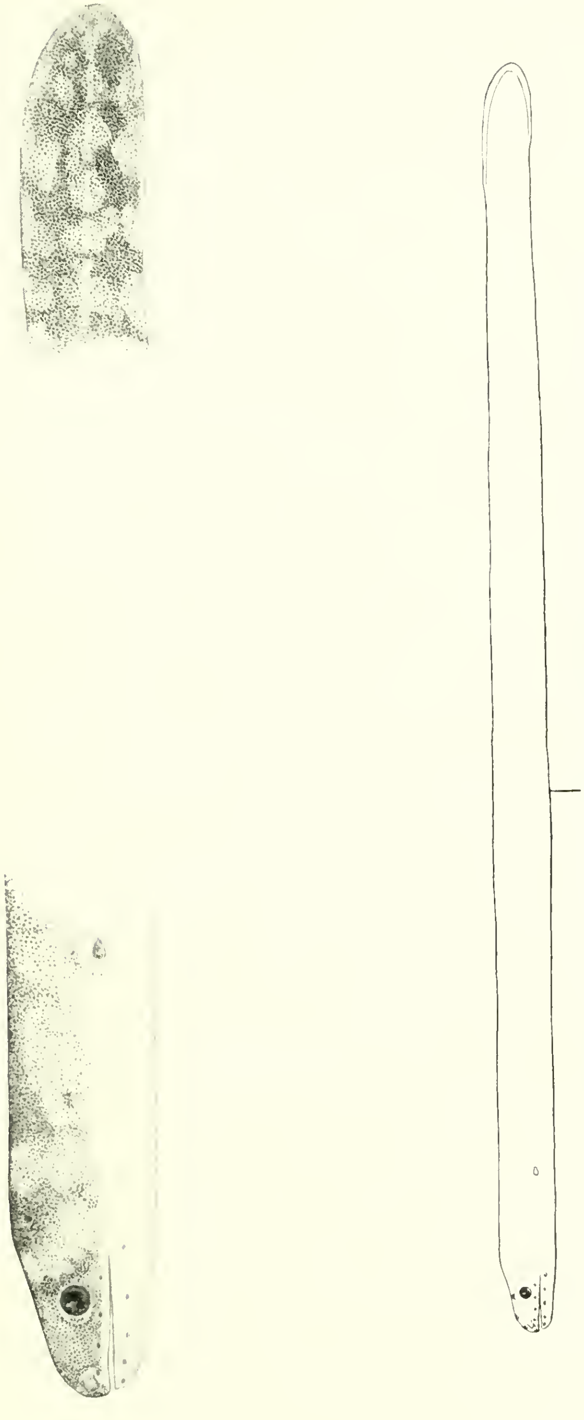
115910, Rose Island, reef, June 11--14, 1939, 2 specimens, 148 and 180 mm.

This species may be the young of *U. tigrinus.*

UROPTERYGIUS TIGRINUS (Lesson)

Ichthyophis tigrinus LESSON, Mem. Soc. Hist. Nat. Paris, vol. 4, p. 399, 1829.

52273, Apia, Samoa, Jordan and Kellogg, 1 specimen, 815 mm.



Uropterygius reidi, new species: Holotype (U.S.N.M. No. 116077), 83 mm. in total length.

UROPTERYGIUS FIJIENSIS Fowler and Bean

FIGURE 3, *f*

Uropterygius fijiensis FOWLER and BEAN, Proc. U. S. Nat. Mus., vol. 63, art. 19, p. 9, 1923.

Not taken by me and no specimen from the Phoenix or Samoan Islands, but included here for comparative purposes. Type, only known specimen, now measures 605 mm. when straightened out, instead of 582 mm. as recorded by Fowler.

UROPTERYGIUS XANTHOPTERUS Bleeker

FIGURE 3, *i*

Uropterygius xanthopterus BLEEKER, Nat. Tijdschr. Ned. Indië, vol. 19, p. 350, 1859.

115912, Enderbury Island, reef, May 15–19, 1939, 5 specimens 108 to 200 mm.

115913, Canton Island, lagoon, April 23 to May 12, 1939, 3 specimens, 280 to 355 mm.

115911, Swains Island, reef, May 3–9, 1939, 14 specimens, 74 to 210 mm.

115916, Rose Island, reef, June 11–14, 1939, 27 specimens, 88–225 mm.

115914, Hull Island, reef, July 12–15, 1939, 3 specimens, 98–171 mm.

115915, Canton Island, lagoon, May 25–26, 1939, 1 specimen, 295 mm.

115917, Canton Island, reef of widest shallow channel, May 13, 1939, 3 specimens, 181–218 mm.

Although authors have referred this species to the synonymy of *U. marmoratus*, my extensive material indicates that the two species are certainly distinct. *U. xanthopterus* has longer caudal fin rays and is a slenderer eel; the depth is about 26 to 30 instead of 18 to 23 in the total length. The caudal fin rays of *U. marmoratus* are at all lengths very short (usually a dissection is required to measure them), about 23 to 27 times in the head. The color pattern is always mottled on *marmoratus*, even in those 100 mm. in length, and there are no white spots on head or body.

Bleeker's Atlas figures *U. xanthopterus* on plate 164, figure 4, and that is no doubt the species of which I have numerous specimens, but his figure does not show the pale spots on the head or the body, perhaps because these were obscure at the length of his specimen, 198 mm.

UROPTERYGIUS CONCOLOR Rüppell

FIGURE 3, *g*

Uropterygius concolor RÜPPELL, Neue Wirbelthiere . . . , Fische, p. 83, pl. 20, fig. 4, 1835.

115908, Tau Island, reef at Siulagi Point, June 27, 1939, 1 specimen, 52 mm. Identification doubtful.

52458, Apia, Samoa, Jordan and Kellogg, 1 specimen, 150 mm.

UROPTERYGIUS SUPRAFORATUS (Regan)

Gymnomuraena supraforata REGAN, Ann. Mag. Nat. Hist., ser. 8, vol. 4, p. 439, 1909.

No specimen in the National Museum from this area.

UROPTERYGIUS FASCIOLATUS (Regan)

Gymnomuraena fasciolata Regan, Ann. Mag. Nat. Hist., ser. 8, vol. 4, p. 438, 1909.

No specimen in the National Museum from this area.

UROPTERYGIUS REIDI, new species

Plate 5

Holotype.—A specimen (U. S. N. M. No. 116077) 83 mm. in total length taken by Leonard P. Schultz on the reef of Tau Island at Siulagi Point, June 27, 1939, along with two paratypes (U. S. N. M. No. 116078) bearing same data.

Description.—(Based on the holotype and two paratypes. Detailed measurements are recorded here in millimeters, first for the holotype, and then for the two paratypes in parentheses. These measurements are computed into proportional length and presented in the key on page 27.) Total length 83 (60; 55 mm.); length of head 10 (7.7; 7.0 mm.); length of snout 1.8 (1.3; 1.1); diameter of eye 0.5 (0.4; 0.3); length from tip of snout to rear corner of mouth where upper and lower jaws meet 3.4 (2.3; 1.8); least width of fleshy interorbital space 1.4 (1.0; 0.7); greatest depth of body 3.6 (2.0; 1.7); greatest width or thickness of the body 2.4 (1.5; 1.2); distance from snout to anus 35 (27.4; 24.8); length of tail 48 (31.6; 30.2); length of middle rays of caudal fin 0.4 (0.4; 0.3).

The teeth on the maxillary are in two rows, an outer row of small ones and an inner row of six or seven larger canine teeth that extend as far back as the outer row; vomer with a single row of caninelike teeth; lower jaw with two rows of teeth similar to those on the maxillary. The intermaxillary plate has several canine teeth centrally with a marginal row of small conical teeth.

Anterior pair of nostrils tubular; around the base of each nostril are the usual three pores; another pair of pores on top of the snout, closer to tip of snout than front of eye; the posterior nostril is over the middle of the eye, without any pore near it, but it has a slightly elevated rim. Three pores in upper lip on each side behind those around base of anterior nostril; lower jaw with five pairs of pores.

Gill openings in line with mouth a little below the level of the eye.

Color pattern consists of about 38 to 43 light-brownish cross bars on the back that extend on the sides where they more or less join one another; but along the midaxis are pale interspaces or roundish blotches below the brownish saddlelike bars above, alternating with the pale interspaces on the back; lower jaw white and under side of head plain pale, ventral side of body plain pale; nostrils pale.

This new species differs from all others in the genus *Uropterygius* that have a single nasal opening over the eye and two rows of teeth on the jaws in its color pattern of light-brownish cross bands or bars on upper sides separated by pale interspaces dorsally and roundish blotches along the midaxis.

Named *reidi* in honor of Earl D. Reid, senior scientific aide, division of fishes, United States National Museum, in recognition of his ichthyological contributions and help in connection with the first sorting of my collections from the Phoenix and Samoan Islands.

UROPTERYGIUS MACROCEPHALUS (Bleeker)

Gymnothorax macrocephalus Bleeker, Ned. Tijdschr. Dierk., vol. 2, p. 54, 1865.

No specimen in the National Museum from this area. Jordan and Seale's *macrocephalus* I find to be *micropterus*.

UROPTERYGIUS MICROPTERUS (Bleeker)

Figure 3, *h*.

Muraena micropterus Bleeker, Nat. Tijdschr. Ned. Ind., vol. 3, p. 298, 1852.

115909, Enderbury Island, May 15–19, 1939, 1 specimen, 125 mm. total length.

52284, Apia, Samoa, Jordan and Kellogg, 5 specimens.

51716 (2 types of *Anarchias knighti* Jordan and Starks), Apia, Samoa, Jordan and Kellogg.

118398, Apia, Samoa, Jordan and Kellogg, 1 specimen.

UROPTERYGIUS MARMORATUS (Lacepède)

Figure 3, *e*.

Gymnomuraena marmorata Lacepède, Histoire naturelle des poissons, vol. 5, pp. 648, 649, 1803.

115930, Tutuila Island, Fagasa Bay, rock pools, June 5, 1939, 6 specimens, 74 to 205 mm.

115931, Tutuila Island, reef at Alofau, June 3, 1939, 1 specimen, 355 mm.

115934, Enderbury Island, reef, May 15–19, 1939, 1 specimen, 540 mm.

115929, Canton Island, reef at ocean, April 25–28, 1939, 1 specimen, 515 mm.

115933, Canton Island, lagoon, May 23–25, 1939, 3 specimens, 155–210 mm.

115932, Swains Island, reef, May 3–9, 1939, 1 specimen, 160 mm.

52522, Apia, Samoa, Jordan and Kellogg, 1 specimen.

The young of this species have but two rows of maxillary teeth and two rows of mandibular teeth. At a total length of from 250 to 350 mm. the extra rows of teeth appear. The vomer begins with a single row and in very large ones may have three rows of teeth anteriorly. No doubt other species of this type of eel have dental changes occurring with increase in length and age.

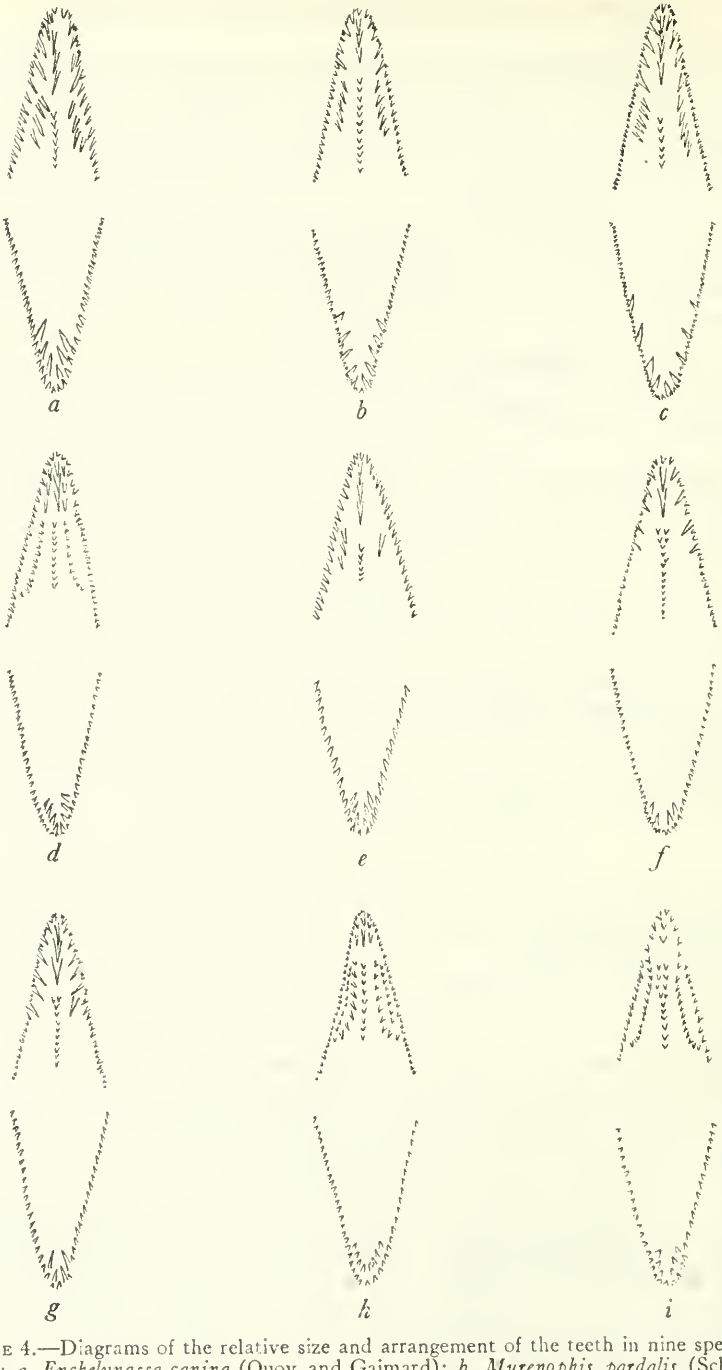


Figure 4.—Diagrams of the relative size and arrangement of the teeth in nine species of eels: *a*, *Enchelynassa canina* (Quoy and Gaimard); *b*, *Murenophis pardalis* (Schlegel); *c*, *Gymnothorax schismatorhynchus* (Bleeker); *d*, *G. buroensis* (Bleeker); *e*, *G. monostigma* (Regan); *f*, *G javanicus* (Bleeker), adult; *g*, *G. pseudothyrsoideus* (Bleeker); *h*, *G. leucostictus* Jenkins, young; *i*, *G. thyrsoidea* (Richardson). Upper half of each diagram represents the upper, jaw, and lower part the lower jaw.

Genus MURENOPHIS Cuvier

Murenophis Cuvier, Tableau élémentaire de l'histoire naturelle des animaux, p. 329, 1798. (Type, *Muraena helena* Linnaeus.)

MURENOPHIS PARDALIS (Schlegel)

Figure 4, *b*

Muraena pardalis Schlegel, Siebold's Fauna Japonica, Pisces, pts. 10–11, p. 268, pl. 119, 1846.

115994, Enderbury Island, reef, May 15–19, 1939, 13 specimens, 70 to 173 mm.

115996, Canton Island, reef of widest shallow channel, May 13, 1939, 1 specimen, 81 mm.

115995, Canton Island, reef at ocean, April 25–28, 1939, 21 specimens, 48 to 133 mm.

Color notes taken on Canton Island specimens: Background color brown with white spots; crimson-red nostrils on head and crimson-red spots along the outer edge of the dorsal and anal fins between the white bars; tip of tail red.

Genus ENCHELYNASSA Kaup

Enchelynassa Kaup, Arch. Naturg., vol. 21, p. 213, 1855. (Type, *E. bleekeri* Kaup.)

ENCHELYNASSA CANINA (Quoy and Gaimard)

Figure 4, *a*

Muraena canina Quoy and Gaimard, Voyage autour du monde . . . *Uranie*, Poissons, p. 247, 1824.

116075, Enderbury Island, reef, May 15–19, 1939, 7 specimens, 335 to 730 mm.

116076, Swains Island, reef, May 3–9, 1939, 3 specimens, 527 to 655 mm.

Genus GYMNOTHORAX Bloch

Gymnothorax Bloch, Naturgeschichte der ausländischen Fische, vol. 9, p. 83, 1794. [Type, *Gymnothorax reticularis* Bloch as restricted by Bleeker, Ned. Tijdsch. Dierk., vol. 2, p. 121 (9), 1865 (=*G. ruppelli* McClelland).]

KEY TO THE SPECIES REFERRED TO THE GENUS GYMNOTHORAX AS REPRESENTED BY SPECIMENS IN THE NATIONAL MUSEUM FROM THE PHOENIX AND SAMOAN ISLANDS

1*a*. Within marginal series of teeth on intermaxillary plate occur three rows of enlarged teeth, more or less in lengthwise series, middle row composed of longest teeth; posterior nostril with a somewhat raised rim; inner row of teeth on maxillary usually numbers 5 to 10.

2*a*. Color pattern of reticulated spots forming narrow dendritic bars most prominent on tail, the spots in lengthwise series; sometimes the bars are so much expanded that ground color is dark brown or blackish, then the pale interspaces are very narrow lines, but more prominent and contrast with the darker obscure bars. (The typical color phase for my specimens is figured in Bull. U. S. Fish Comm., vol. 23, pt. 1, fig. 24, p. 95, as *G. ercodes;* Bleeker's Atlas pl. 190, fig. 1, of *G. buroensis* though similar lacks the spots arranged to form bars as found in but two of my specimens. However, since there are intermediate color patterns, I am keeping the two forms together for the present.) The following proportions were computed from specimens 189, 247, and 305 mm. in total length: Head 6.7 to 7.1; depth 10.9 to 15.7; snout to anus 2.1 to 2.14; tail 1.87 to 1.92; all in total length. Head 3.2 to 3.38; depth 5.2 to 7.3, both in distance from snout to anus. Snout 5.5 to 6.1; snout to rictus 2.4 to 2.52; snout to 4th pore in upper lip 5.4 to 6.7; snout to posterior nostril 4.9 to 5.3; all in length of head. Eye 1.38 to 1.42 in snout. Base of posterior nostril is over space from front of eye to front of pupil. Young and adults with only two rows of teeth on maxillary. (Fig. 4, *d.*)___________ Gymnothorax buroensis (Bleeker)

2*b*. Color brown with numerous round white spots on head and body, more numerous anteriorly than posteriorly; young with three rows of teeth on maxillary but only two on those 400 mm. or longer; gill opening in a black blotch; tip of tail always white (the last two characters distinguish this form from *G. meleagris*). The following proportions were computed from the type of *G. leucostictus* (158 mm.) and a 490-mm. specimen: Head 7.7 to 8.2; depth 11 to 18; snout to anus 2.2 to 2.3; tail 1.8; all in the total length. Head 3.5 to 3.7; depth 5 to 8, both in snout to anus. Snout 4.7 to 5.3; snout to rictus 2.1 to 2.5; snout to 4th pore in upper lip 5.1; snout to posterior nostril 5.16 to 5.2, all in length of head. Eye 1.44 to 2.25 in snout. (Fig. 4, *h.*)

Gymnothorax leucostictus Jenkins

1*b*. Only a middle row of somewhat enlarged to fanglike teeth developed within marginal series on intermaxillary plate.

3*a*. Inside marginal series of teeth on maxillary occur either 1 to 5 teeth in an inner series or no teeth (usually in adults) where inner row may be expected; snout and front of jaw not white.

4*a*. A definite black blotch behind eye and somewhat encircling it posteriorly; base of posterior nostrils usually white; usually four or five white spots around pores on each side of lower jaw and three or four along each side of upper lip; margins of median fins pale posteriorly; color plain chocolate-brown; inner row of maxillary teeth one to three in young and absent in those 300 mm. in length and longer; vomerine teeth uniserial; rim of posterior nostril much elevated; nostril above front of eye to front of pupil; anus about in middle of length; head 8.8 in total length and 4.4 in snout to anus; snout 5 in head; eye 2 in snout; snout to rictus 2.6 in head. Gill openings not in a black blotch. (Fig. 4, *e.*)_____________Gymnothorax monostigma (Regan)

4*b*. No single black blotch behind eye.

5*a*. Snout to rictus about ½ length of head; jaws long and slender and not completely closing; color plain chocolate-brown; margin of dorsal and anal plain white; fanglike teeth at intervals on both jaws with small teeth between them along margin of jaws; posterior nostril with an elevated rim and located much in front of eye in young but over front of eye in adults; tips of anterior nostrils on adults with a funnellike expansion. The following proportions were computed from 212 and 580 mm. specimens: Head 7.5 to 7.85; depth 14.1 to 26.5; snout to anus 2.1 to 2.44; all in total length. Head 3.2 to 3.74; depth 7 to 10.9; both in snout to anus. Mouth 2.0 to 2.3; snout 4.5 to 4.7; both in length of head. Eye 2.5 to 2.8 in the snout. (Fig. 4, *c.*)

Gymnothorax schismatorhynchus (Bleeker)

5*b*. Snout to rictus more than 2.3 times in head; jaws not so long and slender; color not plain brown but usually mottled or blotched with black and white or with numerous dendritic blackish cross bars or with black rings separated by pale interspaces.

6*a*. Gill openings in a black blotch; body mottled or with black blotches in a more or less uniform pattern or in rows; vomerine teeth usually biserial or in irregular row; although rim of posterior nostril is a little elevated the nostril occurs from over front of eye to over front of pupil.

7*a*. Body mottled to blackish, with mottlings sometimes obscure but always lighter areas or lines are visible anteriorly by careful inspection; in young 80 to 100 mm. long black blotch around gill opening is obscure but even in darkest color phase mottling is visible; margin of median fins with narrow pale edges posteriorly; vomerine teeth biserial or one irregular row; color in life, a brilliant green stripe on outer margin of dorsal and anal fins along their entire lengths and on caudal fin; body otherwise very blackish brown with light brown mottlings; fine longitudinal black lines on lower sides of head.

Gymnothorax flavimarginata (Rüppell)

7*b*. Black blotches in about three irregular rows with pale brown interspaces, these arranged in a somewhat definite color pattern; blotches on head fine, and in large adult specimens pale brown interspaces with numerous small black spots; margin of median fins posteriorly in adults at least without distinct white edges; ventrally large black blotches give way to either smaller spots or anteriorly abdomen is almost plain pale brown; vomerine teeth in an irregular row or biserial anteriorly; large adults lack inner row of teeth on maxillary, but some of teeth are much longer than others. (Fig. 4, *f*.)

Gymnothorax javanicus (Bleeker)

6*b*. Gill openings not in a black blotch.

8*a*. Middle teeth of intermaxillary plate little enlarged or not longer than marginal series, in combination with absence of inner row of maxillary teeth except on specimens 200 mm. and shorter, when one to three teeth may occur; inside of mouth sometimes spotted; vomerine teeth usually biseral or in an irregular row, always biserial in adults; mouth closes.

9*a*. Color pattern usually consists of black specks or tiny black spots, but these are evenly distributed and not arranged to form bars; in young up to about 100 mm. in length round black spots, size of pupil, are arranged in four to six irregular rows on each side of body; from 150 to 200 mm. these spots have pale centers; 200 to 300 mm., blackish rings become broken into small spots arranged more or less as a ring of small spots; on larger specimens body becomes speckled with tiny black spots very close together; another color phase shows these spots expanded to form a mottled pattern, or with appearance of white dendritic specks between black spots but never arranged to form cross bars; rim of posterior nostril a little elevated; inside of mouth usually plain pale. (Fig. 5, *h*.)______________________**Gymnothorax picta** (Ahl)

9*b*. Color pattern mottled, somewhat approaching that of *G. picta* in its mottled phase, but overlaying this mottling are about 50 to 60 dendritic blackish bars in combination with a barred lower jaw and upper lip; inside of mouth usually spotted.

Gymnothorax richardsoni (Bleeker)

8b. Maxillary teeth in two rows and color pattern not composed of small black spots or black specks; middle teeth of intermaxillary plate fanglike or much longer than marginal series.

10*a.* Black rings with pale interspaces on head and body, at least always discernible on tail region.

11*a.* About 17 to 20 black rings completely encircle body even anteriorly on ventral surface of head; pale interspaces about 1½ times wider than black rings that extend on fins; first black ring through eye (snout pale or white); second ring just in front of dorsal origin; third ring usually including gill opening or just in front of it; tip of tail white; anus usually between the eighth and ninth black ring; rim of posterior nostril not elevated on young but a little raised on adults.

Gymnothorax ruppelli (McClelland)

11*b.* About 17 to 20 black rings that do not completely encircle body and head anteriorly; usually these black rings do not meet ventrally on head or trunk forward; posteriorly rings do not extend on anal fin, latter pale in color; anus usually between eighth to tenth black ring; black rings about same width as pale interspaces; first black ring over eye, usually dividing below eye with an extension on snout and to corner of mouth; second black ring at origin of dorsal, sometimes with an extension to corner of mouth; third ring through or at rear of gill opening; rim of posterior nostrils barely if at all elevated.

Gymnothorax petelli (Bleeker)

10*b.* Color pattern not of black rings with pale interspaces encircling body and head.

12*a.* Height of dorsal fin over anus ⅔ depth of body at anus and much longer than snout; middle teeth of intermaxillary plate fanglike, vomerine teeth probably uniserial; body light brownish, mottled with paler on upper half of body and very high dorsal fin; ventral sides plain. The following proportions were computed from a 437 mm. specimen: Head 7.1; depth 17.5; snout to anus 2.24; tail 1.8; all in the total length. Head 3.17; depth 7.8; in snout to anus. Eye 1.56 in snout. Snout 5.25; snout to rictus 2.4; depth of body at anus 2.74; and height of dorsal above anus 2.78, all in length of head. (Fig. 4, *g.*)

Gymnothorax pseudothyrsoideus (Bleeker)

12*b.* Height of dorsal fin, above anus, contained three or more times in depth of body at anus; dorsal fin over anus usually shorter than snout.

13*a.* Middorsal region of head white from between bases of anterior nostrils posteriorly to dorsal fin on young and to or past interorbital space on those 170 mm. and longer, or, if white streak is lacking on those 200 mm. or longer, body is crossed with 40 to 50 dendritic blackish spots forming bars on a paler background.

14*a.* From behind eye occurs a lengthwise series of two to seven or more oblong black blotches, the first just behind eye to about ⅔ to ¾ length of head; second in front of and below dorsal origin; third in front of and above gill opening; others varying in intensity gradually blending with brown blotches with very fine white dividing lines; under side of head and trunk plain pale; dorsal fin white anteriorly; under first brown oblong blotch behind eye occur two or three brown spots below level of eye; corner of mouth brown; anterior nostrils brown; about two to four teeth in inner row on maxillary; vomerine teeth biserial anteriorly; middle teeth of intermaxillary plate fanglike.

Gymnothorax margaritophorus Bleeker

14*b*. Body crossed with dendritic spots forming narrow bars, numbering about 45 to 50 on a pale background of light brown color; no series of brown blotches behind eye; lower jaw white; margin of dorsal fin pale. Color note made when this eel was alive: "Light yellowish-white background with black dendritic spots and blotches."___**Gymnothorax gracilicauda** Jenkins

13*b*. No white middorsal line or streak on head and no narrow dendritic dark cross bars on body; if blackish spots more or less arranged in bars occur these are not dendritic, but spots are compact with almost clean-cut edges.

15*a*. Color pattern composed of large brown blotches arranged more or less regularly and separated by narrow pale lines that occur more or less as irregular vertical streaks posteriorly, and in large specimens the pale streaks may have small dark specks; under side of head and trunk plain pale; margin of median fins white posteriorly; middle teeth of intermaxillary plate fanglike; teeth on vomer uniserial; vertebrae in one specimen totaled 126, with 49 vertebrae to anus; rim of posterior nostril not raised; lower jaw not white, but about same color as rest of head.

Gymnothorax undulata (Lacepède)

15*b*. Color pattern of narrow black blotches on a pale background; some of black spots are somewhat joined, but narrower than the pale light-brownish interspaces; from behind eye to over corner of mouth occur about six small black spots; spots on body may be roundish and arranged in two or three irregular rows, the one along midaxis the most regular; vomerine teeth probably uniserial; vertebrae totaled 128 in one specimen, with 47 to anus.

Gymnothorax fimbriata (Bennett)

3*b*. Inside marginal series of teeth on maxillary occurs a long series of teeth numbering 5 to 14, usually 10 to 14 in young, and in adults as few as five teeth are present; median teeth of intermaxillary plate little enlarged, about same size as marginal series, never fanglike; snout to anus 2⅔ in total length and 1⅔ in tail; vomerine teeth biserial; color brownish, mottled with lighter; margin of median fins pale posteriorly, also anteriorly in young; snout and front of lower jaw white in young, pale in adults; rim of posterior nostril slightly raised; mouth closes. (Fig. 4, *i*.)

Gymnothorax thyrsoidea (Richardson)

GYMNOTHORAX BUROENSIS (Bleeker)

FIGURE 4, *d*

Muraena buroensis BLEEKER, Nat. Tijdschr. Ned. Ind., vol. 13, p. 79, 1857; Atlas ichthyologique . . ., vol. 4, p. 90, pl. 190, fif. 1, 1864.

The following specimens are like the figure of *G. ercodes* cited in key:

116010, Enderbury Island, reef, May 15–19, 1939, 45 specimens, 40 to 247 mm.; several females have ripe eggs loose in their body cavities.

116011, Tutuila Island, reef at entrance to Pago Pago Bay, June 2, 1939, 5 specimens, 161 to 292 mm.

116009, Tau Island, reef at Siulagi Point, June 27, 1939, 7 specimens, 56 to 95 mm.

116018, Hull Island, channel, July 8–12, 1939, 2 specimens, 45 to 70 mm.

116019, Tutuila Island, Fagasa Bay, rock pools, June 5, 1939, 1 specimen, 54 mm.

116020, Hull Island, reef, July 12–15, 1939, 9 specimens, 50 to 125 mm.

116021, Rose Island, lagoon, June 12 to 20, 1939, 5 specimens, 46 to 167 mm.

116014, Canton Island, reef at ocean, April 25–28, 1939, 2 specimens, 112 and 180 mm.

116017, Canton Island, lagoon, April 23 to May 12, 1939, 1 specimen, 183 mm.

116022, Swains Island, reef, May 3–9, 1939, 3 specimens, 70 to 98 mm.

116012, Tutuila Island, reef at Alofau, June 3, 1939, 4 specimens, 145 to 288 mm.

116016, Canton Island, reef of widest shallow channel, May 13, 1939, 1 specimen, 117 mm.

116013, Canton Island, lagoon, May 23 to 25, 1939, 1 specimen, 252 mm.

116023, Rose Island, reef, June 11–14, 1939, 102 specimens, 56 to 330 mm.

116015, Rose Island, reef, June 11–14, 1939, 2 specimens; these are more like pl. 190, fig. 1, in Bleeker's Atlas than like the figure of *G. ercodes*, 160 and 180 mm.

52509, Apia, Samoa, Jordan and Kellogg, 4 specimens.

118399, Apia, Samoa, Jordan and Kellogg, 1 specimen, 150 mm. female with eggs loose in her body cavity.

50843 (type of *Gymnothorax ercodes* Jenkins examined by me), from Hawaii.

52534 (referred to this species with uncertainty), Apia, Samoa, Jordan and Kellogg, 1 specimen.

GYMNOTHORAX LEUCOSTICTUS Jenkins

FIGURE 4, *h*

Gymnothorax leucostictus JENKINS, Bull. U. S. Fish. Comm., vol. 22 (1902), p. 425. fig. 5, 1903.

52326, Apia, Samoa, Jordan and Kellogg, 1 specimen.

50681 (type of *G. leucostictus* Jenkins examined by me), from Honolulu.

GYMNOTHORAX MONOSTIGMA (Regan)

FIGURE 4, *e*

Muraena monostigma REGAN, Ann. Mag. Nat. Hist., ser. 8, vol. 4, p. 438, 1909.

115988, Swains Island, reef, May 3–9, 1939, 13 specimens, 170 to 545 mm.

115989, Enderbury Island, reef, May 15–19, 1939, 24 specimens, 205 to 585 mm.

115992, Hull Island, reef, July 12–15, 1939, 1 specimen, 180 mm.

115993, Tutuila Island, Fagasa Bay, rock pools, June 5, 1939, 1 specimen, 565 mm.

115991, Rose Island, reef, June 11–14, 1939, 1 specimen, 350 mm.

115990, Tau Island, reef at Siulagi Point, June 27, 1939, 1 specimen, 450 mm.

Color in life of a specimen from Swains Island, chocolate-brown; a scarlet-red eye, behind which is a purple-black blotch; the margins of dorsal, caudal, and anal fins posteriorly are bordered with orange, especially brilliant on the caudal fin.

GYMNOTHORAX SCHISMATORHYNCHUS (Bleeker)

FIGURE 4, *c*

Muraena schismatorhynchus BLEEKER, Nat. Tijdschr. Ned. Ind., vol. 4, p. 301, 1853.

116053, Rose Island, lagoon, June 12 to 20, 1939, 1 specimen, 212 mm.

116054, Rose Island, reef 11–14, 1939, 1 specimen, 115 mm.

51717 (type of *Rhinamuraena critima* Jordan and Seale), Samoa, Jordan and Kellogg.

GYMNOTHORAX FLAVIMARGINATA (Rüppell)

Muraena flavimarginata RÜPPELL, Atlas zu der Reise im nördlichen Afrika, Fische, p. 119, pl. 30, fig. 3, 1828.

116030, Canton Island, reef at ocean, April 25–28, 1939, 16 specimens, 81 to 340 mm.

116033, Hull Island, channel, July 8–12, 1939, 1 specimen, 110 mm.

116032, Tutuila Island, reef at Alofau, June 3. 1939, 9 specimens, 170 to 435 mm.

116031, Enderbury Island, reef, May 15–19, 1939, 1 specimen, 290 mm.

116027, Canton Island, lagoon, May 25–26, 1939, 1 specimen, 430 mm.

116036, Canton Island, lagoon, May 23–25, 1939, 17 specimens, 195 to 420 mm.

116034, Swains Island, reef, May 3–9, 1939, 6 specimens, 100 to 255 mm.

116035, Tutuila Island, Fagasa Bay, rock pools, June 5, 1939, 3 specimens, 190 to 290 mm.

116028, Canton Island, lagoon, April 23 to May 12, 1939, 1 specimen, 120 mm.

116029, Hull Island, reef, July 12 to 15, 1939, 2 specimens, 85 to 100 mm.

118400, Apia, Samoa, W. H. Jones, 1 specimen.

52213, Apia, Samoa, Jordan and Kellogg, 3 specimens.

52245, Apia, Samoa, Jordan and Kellogg, 1 specimen.

GYMNOTHORAX JAVANICUS (Bleeker)

FIGURE 4, *f*.

Muraena javanicus BLEEKER, Nat. Tijdschr. Ned. Ind., vol. 19, p. 347, 1859; Atlas ichthyologique . . ., vol. 4, p. 95, pl. 179, fig. 2, 1864.

116005, Canton Island, lagoon, May 23–25, 1939, 4 specimens, 427 to 610 mm.

116006, Canton Island, lagoon, May 25–26, 1939, 1 specimen, 450 mm.

116004, Rose Island, reef, June 11–14, 1939, 1 specimen, 625 mm.

52316, Apia, Samoa, Jordan and Kellogg, 3 specimens.

GYMNOTHORAX PICTA (Ahl)

Figure 5, h

Muraena picta Ahl, Specimen ichthyologicum de Muraena et Ophichtho, p. 8, 1789 (on Rüppell).

116999, Tau Island, reef at Siulagi Point, June 27, 1939, 1 specimen, 450 mm.

116998, Canton Island, lagoon, May 23–25, 1939, 2 specimens, 255 to 270 mm.

116000, Hull Island, channel, July 8–12, 1939, 3 specimens, 330 to 675 mm.

116003, Hull Island, channel, July 7–17, 1939, 1 specimen, 345 mm.

116997, Enderbury Island, reef, May 15–19, 1939, 2 specimens, 525 to 560 mm.

116002, Canton Island, reef at ocean, April 25–28, 1939, 3 specimens, 445 to 635 mm. The 445-mm. female contains nearly ripe eggs.

116008, Swains Island, reef, May 3–9, 1939, 16 specimens, 85 to 560 mm. Several ripe females observed on this reef, one with eggs flowing from the vent.

116001, Tutuila Island, reef at Alofau, June 3, 1939, 6 specimens, 270 to 550 mm.

116007, Rose Island, reef, June 11–14, 1939, 3 specimens, 510 to 575 mm.

52536, Apia, Samoa, Jordan and Kellogg, 1 specimen.

52508, Apia, Samoa, Jordan and Kellogg, 1 specimen.

52236 (identified by Jordan and Seale as *G. favagineus* but referred to this species with uncertainty), length 108 mm., Pago Pago, Samoa, Jordan and Kellogg.

GYMNOTHORAX RICHARDSONI (Bleeker)

Muraena richardsoni Bleeker, Nat. Tijdschr Ned. Ind., vol. 3, p. 296, 1852; Atlas ichthyologique . . ., vol. 4, p. 100, pl. 186, fig. 2, 1864.

116055, Tutuila Island, reef at Alofau, June 3, 1939, 1 specimen, 187 mm.

52453, Apia, Samoa, Jordan and Kellogg, 3 specimens.

GYMNOTHORAX RUPPELLI (McClelland)

Dalophis rupelliae McClelland, Calcutta Journ. Nat. Hist., vol. 5, p. 213, 1845 (on Rüppell).

116026, Tutuila Island, reef at Alofau, June 3, 1939, 6 specimens, 118 to 305 mm.

116025, Canton Island, lagoon, May 23–25, 1939, 2 specimens, 132 and 295 mm.

116024, Canton Island, lagoon, April 23 to May 12, 1939, 1 specimen, 315 mm.

GYMNOTHORAX PETELLI (Bleeker)

Muraena petelli Bleeker, Nat. Tijdschr. Ned. Ind., vol. 11, p. 84, 1856.

116064, Enderbury Island, reef, May 15–19, 1939, 17 specimens, 60 to 525 mm.

116066, Hull Island, reef, July 12–15, 1939, 1 specimen, 111 mm.

116068, Tutuila Island, reef at Alofau, June 3, 1939, 2 specimens, 181 and 265 mm.

116067, Canton Island, reef at ocean, April 25 to 28, 1939, 15 specimens, 94 to 180 mm.

116063, Hull Island, channel, July 7–17, 1939, 1 specimen, 99 mm.

116062, Swains Island, reef, May 3–9, 1939 1 specimen, 179 mm.

116065, Tau Island, reef at Siulagi Point, June 27, 1939, 7 specimens, 53 to 198 mm.

116061, Rose Island, reef, June 11–14, 1939, 6 specimens, 320 to 538 mm.

52319, Apia, Samoa, Jordan and Kellogg, 2 specimens.

GYMNOTHORAX PSEUDOTHYRSOIDEUS (Bleeker)

FIGURE 4, *g*

Muraena pseudothyrsoidea BLEEKER, Nat. Tijdschr. Ned. Ind., vol. 3, p. 778, 1852; Atlas ichthyologique . . . vol. 4, p. 104, pl. 190, fig. 2, 1864.

116047, Canton Island, lagoon, April 23 to May 12, 1939, 1 specimen, 437 mm.

GYMNOTHORAX MARGARITOPHORUS Bleeker

Gymnothorax margaritophorus BLEEKER, Ned. Tijdschr. Dierk., vol. 2 (1864), p. 53, 1865; Atlas ichthyologique . . . vol. 4, p. 97, pl. 175, fig. 1, 1864.

116070, Hull Island, channel, July 8–12, 1939, 1 specimen, 128 mm.

116071, Tutuila Island, reef at Alofau, June 3, 1939, 2 specimens, 125 and 170 mm.

116073, Rose Island, reef, June 11–14, 1939, 26 specimens, 51 to 140 mm.

116072, Tau Island, reef at Siulagi Point, June 27, 1939, 11 specimens, 66 to 136 mm.

116069, Rose Island, lagoon, June 12–20, 1939, 1 specimen, 69 mm.

116074, Hull Island, reef, July 12–15, 1939, 3 specimens, 79 to 110 mm.

51713 (type of *Gymnothorax talofa* Jordan and Seale), Apia, Samoa, Jordan and Kellogg.

GYMNOTHORAX GRACILICAUDA Jenkins

Gymnothorax gracilicauda JENKINS, Bull. U. S. Fish Comm., vol. 22 (1902), p. 426, fig. 6, 1903.

116039, Canton Island, reef at ocean, 9 specimens, 110 to 225 mm.

116038, Swains Island, reef, May 3–9, 1939, 19 specimens, 106 to 275 mm.

116041, Enderbury Island, reef, May 15–19, 1939, 6 specimens.

116040, Tau Island, reef at Siulagi Point, June 27, 1939, 1 specimen, 101 mm.

116042, Canton Island, reef of widest shallow channel, May 13, 1939, 4 specimens, 116 to 233 mm.

116037, Rose Island, reef, June 11 to 14, 1939, 149 specimens, 56 to 340 mm.

52531, Apia, Samoa, Jordan and Kellogg, 2 specimens.

50679 (type of *Gymnothorax gracilicauda* Jenkins examined by me), from Honolulu.

GYMNOTHORAX UNDULATA (Lacepède)

Muraenophis undulatus LACEPÈDE, Histoire naturelle des poissons, vol. 5, pp. 629, 644, pl. 64, fig. 2, 1803.

116043, Canton Island, lagoon, May 23–25, 1939, 7 specimens, 275 to 335 mm.

116046, Canton Island, lagoon, May 25–26, 1939, 2 specimens 315 to 355 mm.

116045, Tutuila Island, reef at Alofau, June 3, 1939, 10 specimens, 133 to 540 mm.

116044, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 1 specimen, 310 mm.

52510, Apia, Samoa, Jordan and Kellogg, 4 specimens.

GYMNOTHORAX FIMBRIATA (Bennett)

Muraena fimbriata BENNETT, Proc. Zool. Soc. London, 1831, pt. 1, p. 168.

116048, Tau Island, reef at Siulagi Point, June 27, 1939, 1 specimen, 465 mm.

116049, Canton Island, lagoon, May 23–25, 1939, 6 specimens, 275–360 mm.

116052, Tutuila Island, reef at Alofau, June 3, 1939, 3 specimens, 94 to 280 mm.

116050, Canton Island, lagoon, April 23 to May 12, 1939, 1 specimen, 271 mm.

116051, Hull Island, channel, July 8–12, 1939, 1 specimen, 305 mm.

52470, Apia, Samoa, Jordan and Kellogg, 3 specimens.

Figure 186, p. 377, in volume 3 of Weber and de Beaufort's "Fishes of the Indo-Australian Archipelago," 1916, is a good representation of my specimens. There is no overlapping in color pattern between *fimbriata* and *undulata*.

GYMNOTHORAX THYRSOIDEA (Richardson)

FIGURE 4, *i*

Muraena thyrsoidea RICHARDSON, The zoology of the voyage of H. M. S. *Sulphur*, Fishes, p. 111 (non pl. 49, fig. 1), 1844.

116057, Tutuila Island, reef at Alofau, June 3, 1939, 6 specimens, 151 to 291 mm.

116059, Enderbury Island, reef, May 15–19, 1939, 8 specimens, 120 to 280 mm.

116056, Canton Island, lagoon, May 23–25, 1939, 1 specimen, 198 mm.

116060, Tau Island, reef at Siulagi Point, June 27, 1939, 11 specimens, 53 to 413 mm.

116058, Canton Island, reef at ocean, April 25–28, 1939, 34 specimens 74 to 224 mm.

52238, Pago Pago, Samoa, Jordan and Kellogg, 1 specimen.

Family CONGRIDAE

Genus CONGER Schaeffer

Conger SCHAEFFER, Epistola . . . de studii ichthyologici . . ., p. 20, 1760 (type, *Muraena conger* Linnaeus; tautotypic).—HOUTTUYN, Natuurlyke historie of uitvoerige beschryving der dieren, planten en mineraalen . . . van den Heer Linnaeus, vol. 7, p. 103, 1764 (type, *Muraena conger* Linnaeus; tautotypic).

CONGER CINEREUS Rüppell

FIGURE 5, *b*

Conger cinereus RÜPPELL, Atlas zu der Reise im nördliche Afrika, Fische, p. 115, pl. 20, fig. 1, 1828.

115970, Tau Island, reef at Siulagi Point, June 27, 1939, 1 specimen, 300 mm.

115967, Rose Island, reef, June 11–14, 1939, 1 specimen, 175 mm.

115968, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 1 specimen, 583 mm.

115969, Tutuila Island, reef at Alofau, June 3, 1939, 19 specimens, 175 to 485 mm.

52298, Apia, Samoa, Jordan and Kellogg, 3 specimens.

52460 (recorded as *Congrellus guttulatus* by Jordan and Seale, but upon careful examination I find it cannot be that genus; part of the tail was lost and later regenerated, which helped Jordan and Seale place it in the genus *Congrellus;* the teeth were never examined, as I had to cut the jaws to open the mouth), Apia, Samoa, Jordan and Kellogg.

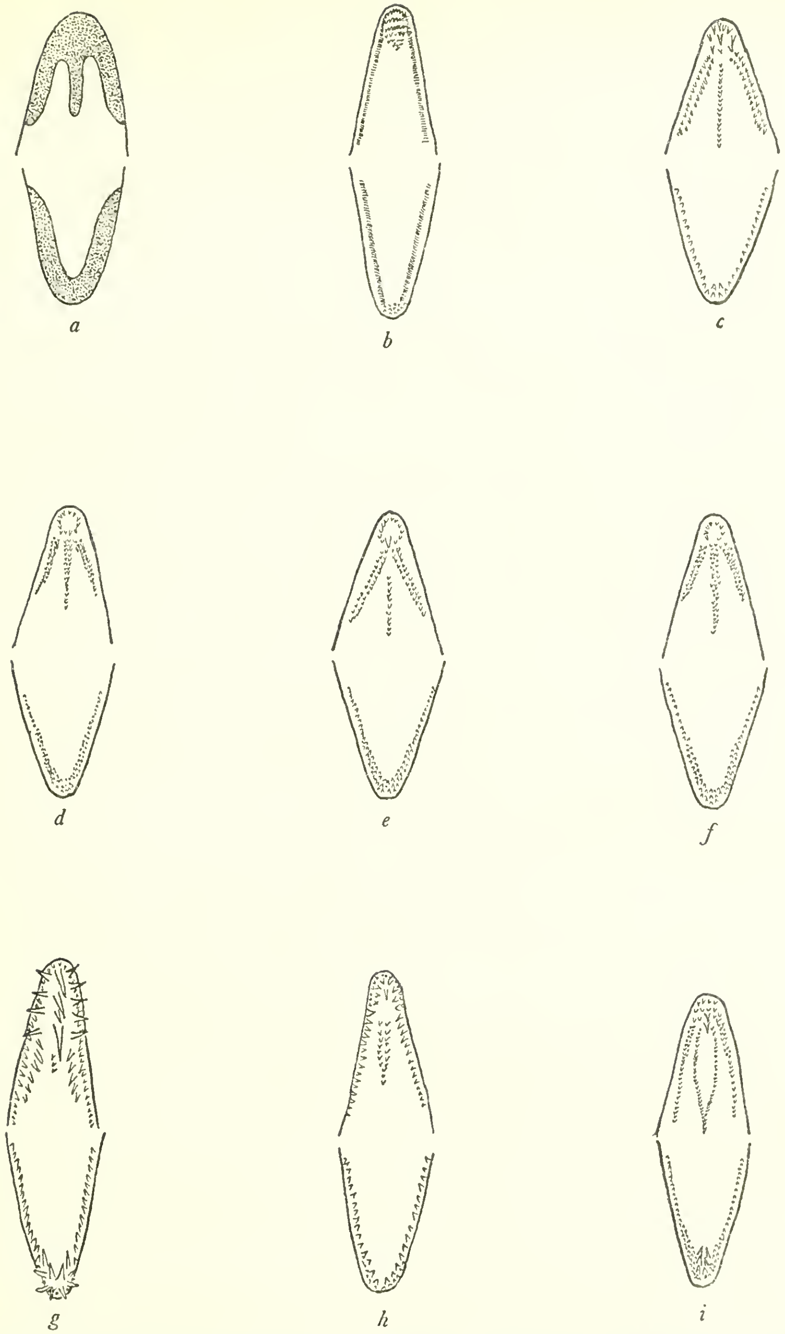


FIGURE 5.—Diagrams of the teeth of nine species of apodal fishes: *a*, *Muraena celebesensis* (Kaup); *b*, *Conger cinereus* Rüppell; *c*, *Muraenichthys laticaudata* (Ogilby); *d*, *M. schultzei* Bleeker; *e*, *M. fowleri*, new species; *f*, *M. macropterus* Bleeker; *g*, *Enchelynassa canina* (Quoy and Gaimard); *h*, *Gymnothorax picta* (Ahl); *i*, *Kaupichthys diodontus*, new genus and species. Upper half of figure represents the upper jaw and lower half the dentary. The approximate number of teeth is shown, except for the villiform teeth on *M. celebesensis*.

Family MORINGUIDAE

Genus MORINGUA J. E. Gray

Moringua Gray, Zool. Misc., 1831, p. 9. [Type, designated by Bleeker, Ned. Tijdschr. Dierk., vol. 2, p. 114 (2), 1865, *Moringua raitaborua* Cantor (=*Muraena raitaborua* Hamilton-Buchanan).]

KEY TO THE SPECIES OF MORINGUA COLLECTED AMONG THE PHOENIX AND SAMOAN ISLANDS

1a. Dorsal and anal fins with rays visible anteriorly, then they reappear near caudal fin, space between rays represented by a low fold or a groove where fold should be expected.

  2a. Pectoral fin not vestigial but about as long as or longer than snout and 4 to 9 times in head.

    3a. Greatest depth in total length about 52 to 60 times; head 13 to 15; anus to anal origin 11 or 12; anus to dorsal origin 10 or 11. Head in distance from anus to tip of tail 4½ to 5 and depth 16 to 18 times. Pectoral fin 5¾ to 9 in head, snout 5 or 6; anus to anal origin 0.8 to 1.2; and eye 17 to 20; about 114 lateral line pores from gill opening to near tip of tail, incomplete; eye in pectoral 2 and in snout 2 or 3; dorsal half of body usually blackish, ventral half pale; margin of tail fins blackish **Moringua bicolor Kaup**

    3b. Greatest depth in total length about 35 to 40; head 9 to 11; anus to anal and dorsal origins 13 to 16. Head about 3⅓ to 3½ in tail (anus to tip of caudal fin), and depth 11 or 12. Pectoral fin 4 to 6 in head, snout 7, anus to anal origin 1.2 to 1.7; and eye about 14. Eye in pectoral 3⅕ and in snout 2. About 97 pores along lateral line, incomplete in latter third of tail--- **Moringua macrochir Bleeker**

  2b. Pectoral fin small about two to three times in snout and 14 to 20 times in head; greatest depth 48 to 50; head 10 to 15; anus to anal origin 11 to 14, and anus to dorsal origin 10 to 12 times, all in total length. Head 3 to 4⅔ in tail, and depth 14 to 16 times. Snout 6 to 8 times in head, eye 26 to 33, anus to anal origin ⅘ to 1⅖. Eye 4 or 5 in snout and 1 to 2 times in pectoral fin length. About 98 to 102 pores in lateral line, incomplete on tail. (Fig. 2, *g.*)------- **Moringua microchir Bleeker**

1b. Dorsal and anal fins without visible rays except as they join caudal fin, these fins represented by a low fold or only a groove occurs where fins are expected; eyes and pectoral fins very small; latter often vestigial.

  4a. Pectoral fin small, about 20 in head. Body more robust, its depth about 36 to 42, head 11 or 12; anus to anal and dorsal origins about 14 times, all in total length. Head about 3⅖ in tail, depth 12⅖ times. Eye 25 to 30 in head, snout 7⅕, and anus to anal origin 1⅕ times. Eye 4 in snout and 1⅖ in pectoral fin. About 99 pores in lateral line, incomplete or ending at last third of tail--- **Moringua macrocephala (Bleeker)**

  4b. Body slenderer, its greatest depth 46 to 90 in total length, head 13 to 16 times; pectoral fin vestigial, 52 to 75 or more times in the head.

    5a. Greatest depth 70 to 90 in total length, anus to anal and dorsal origins 10 to 13 times. Head 4½, greatest depth 20 times in tail. Snout 7 or 8; eye 50 to 55, anus to anal origin ⅔ to ⅘ times in head. Eye 7 in snout and larger than pectoral fin. About 144 pores in lateral line, incomplete last third of tail--------- **Moringua javanica (Kaup)**

5*b*. Greatest depth 45 to 55, head 13 to 15; anus to anal and dorsal origins 13 to 18 times, all in total length. Head 3½ to 4⅔, depth 15 to 17 in tail. Snout 6 or 7, eye 34 to 37, anus to anal origin 9/10 to 13/10 in head. Eye 5 to 6 in snout and larger than pectoral fin. About 98 pores in lateral line, incomplete last third of tail
Moringua abbreviata (Bleeker)

MORINGUA BICOLOR Kaup

Moringua bicolor KAUP, Catalogue of the apodal fish in the collection of the British Museum, p. 107, 1856.

115900, Rose Island, lagoon, June 12 to 20, 1939, 1 specimen, 195 mm.

115901, Tau Island, reef at Siulagi Point, June 27, 1939, 3 specimens, 285, 295, and 245 mm.

MORINGUA MACROCHIR Bleeker

Moringua macrochir BLEEKER, Nat. Tijdschr. Ned. Ind., vol. 9, p. 71, 1855; Atlas ichthyologique, vol. 4, p. 15, pl. 147, fig. 4, 1864.

Origin of dorsal and anal over each other and about ⅔ length of head behind anus; dorsal and anal interrupted beginning near end of tail and continuous with caudal fin; depth 36 to 39; head 9⅗ and 11; anus to anal origin 16 and 13; anus to tip of tail 3⅕ and 3⅖; all in total length; eye 2 in snout; pectoral fin 4 to 5½ in head; lower jaw a little longer than upper; dorsal half of body blackish, below pale; dorsal fin pale; caudal fin blackish as in *M. bicolor*.

115894, Canton Island, reef at ocean, April 25–26, 1939, 1 specimen, 160 mm.

115896, Enderbury Island, reef, May 15–19, 1939, 1 specimen, 155 mm.

115895, Tau Island, reef at Siulagi Point, June 27, 1939, 2 specimens, 135 and 153 mm.

MORINGUA MICROCHIR Bleeker

FIGURE 2, *g*

Moringua microchir BLEEKER, Nat. Tijdschr. Ned. Ind., vol. 4, p. 124, 1853.

Origin of dorsal about ⅖ of head behind that of anal, both fins not interrupted behind their anterior part where rays are visible but continue as a fold to join the caudal fin; origin of anal ⅔ of head behind anus, that of dorsal one head length behind anus; head 10½; depth 48; anus to anal, 14⅓; anus to dorsal 10¾; tail (anus to tip of caudal fin) 3⅖; all in total length. Pectoral 20 in head, and snout 8; eye 4 in snout, and embedded; color plain.

115903, Canton Island, reef of widest shallow channel, May 13, 1939, 1 specimen, 245 mm.

115902, Enderbury Island, reef, May 15 to 19, 1939, 1 specimen, 275 mm.

52232 (*Moringua macrocephala* as recorded by Jordan and Seale), 1 specimen, Pago Pago, Samoa, Jordan and Kellogg.

MORINGUA MACROCEPHALA (Bleeker)

Aphthalmichthys macrocephalus Bleeker, Ned. Tijdschr. Dierk., vol. 1, p. 165, 1863.

115899, Rose Island, lagoon, June 12 to 20, 1939, 1 specimen, 168 mm.

MORINGUA JAVANICA (Kaup)

Aphthalmichthys javanicus Kaup, Catalogue of the apodal fish in the collection of the British Museum, p. 105, fig. 71, 1856.

115898, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and F. Taiga, 1 specimen, 275 mm.

115897, Tutuila Island, reef at Alofau, June 3, 1939, 41 specimens, 235 to 610 mm.

MORINGUA ABBREVIATA (Bleeker)

Aphthalmichthys abbreviatus Bleeker, Ned. Tijdschr. Dierk., vol. 1, p. 163, 1863; Atlas ichthyologique . . ., vol. 4, p. 17, pl. 145, fig. 1, 1864.

Color pale orange, semitranslucent when first coming out of gravel.

115883, Tutuila Island, reef at Alofau, June 3, 1939, 70 specimens, 96 to 365 mm.

115890, Hull Island, reef, July 12–15, 1939, 1 specimen, 96 mm.

115893, Canton Island, reef at ocean, April 25–28, 1939, 14 specimens, 78 to 225 mm.

115888, Canton Island, reef of widest shallow channel, May 13, 1939, 13 specimens, 102 to 225 mm.

115892, Rose Island, lagoon, June 12 to 20, 1939, 21 specimens, 99 to 225 mm.

115889, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 1 specimen, 216 mm.

115886, Tau Island, reef at Siulagi Point, June 27, 1939, 39 specimens, 95 to 280 mm.

115885, Canton Island, lagoon, May 23–25, 1939, 3 specimens, 192 to 250 mm.

115887, Rose Island, reef, June 11 to 14, 1939, 2 specimens, 135 and 137 mm.

115884, Enderbury Island, reef, May 15–19, 1939, 6 specimens, 196 to 330 mm.

115891, Swains Island, reef, May 3–9, 1939, 15 specimens, 98 to 370 mm.

Family ECHELIDAE

KEY TO THE SPECIES OF ECHELIDS COLLECTED AMONG THE PHOENIX AND SAMOAN ISLANDS

1*a*. Pectoral fins present; origin of dorsal fin over base of pectoral fin; anus one head length behind gill opening; snout much depressed, lower jaw a little included; posterior nostril in upper lip, at front of eye, covered with a flap of skin; three pairs of canine teeth at front of lower jaw near midline with an outer irregular double row anteriorly, uniserial posteriorly; teeth on vomer in two widely separated rows that meet posteriorly to become one row; on maxillary a single row of strong conical teeth with a few weaker teeth along their outer margin anteriorly; intermaxillary plate with about three rows of small teeth and two canines in midline; dorsal and anal fins pale; body brownish. Head 7.5 and 7.48; depth 19 and 27.9; snout to anus 3.8 and 3.8; snout to origin of dorsal fin 7.0 and 7.6; tail 1.35 and 1.36; all in total length. Head 1.96 and 1.97 times in snout to anus. Depth 2.52 and 3.7; tip of snout to rictus 2.74 and 2.62; length of pectoral fin 6.8 and 7.7; all in length of head. Eye 2.5 and 2.7 in snout. Snout 1.49 and 1.57 in mouth. Interorbital space 1.67 and 1.77 in snout. Head 5.5 and 5.5; snout to anus 2.8 and 2.8; both in length of tail. (Fig. 5, *i.*) ______________ **Kaupichthys diodontus**, new genus and species

1*b*. Pectoral fins absent; anus more than two head lengths behind gill openings.

2*a*. Origin of dorsal fin nearer to gill opinings than to anus, and about half the distance from tip of snout to anus; head contained 1.8 to 2.0 times in distance from tip of snout to origin of dorsal fin; snout pointed and extending much beyond tip of lower jaw, the part beyond lower jaw contained three times in snout. The following proportions were made from measurements taken on 163 and 234 mm. specimens: Depth 36 to 46; head 9.3 to 9.8; tip of snout to anus 2.34 to 2.63; snout to origin of dorsal 4.97 to 5.1; length of tail 1.61 to 1.65, all in total length. Depth 3.65 to 5.0 and mouth 3.3 to 3.55, both in head. Snout 1.6 to 1.72 in length of gape of mouth. Eye 1.95 to 2.06 in the snout. Head 3.54 to 3.87 in distance from tip of snout to anus. (Fig. 5, *f.*)
Muraenichthys macropterus Bleeker

2*b*. Origin of dorsal fin much less than one head length in front of anus or its origin behind anus; head contained more than three times in distance from tip of snout to origin of dorsal fin.

3*a*. Tip of snout pointed, flattened on ventral surface and projecting beyond tip of lower jaw as much as or more than diameter of eye; teeth on maxillary in two irregular rows, and on dentary two or three rows anteriorly becoming one posteriorly; vomerine teeth uniserial. The following proportions were computed from measurements made on 81 and 104 mm. specimens: Depth 45 to 50; head 9.3 to 9.5; tip of snout to anus 2.27 to 2.3; snout to origin of dorsal 1.73 to 2.08; length of tail 1.76 to 1.78, all in total length. Depth 3.7 to 5.3; mouth 3.61 to 3.87, both in head. Snout 1.47 to 1.48 in mouth. Eye 4.2 to 5 in snout. Head 3.54 to 3.87 in distance from snout to anus. (Fig. 5, *c.*) ____________ **Muraenichthys fowleri**, new species

3*b*. Tip of snout rounded, curved on ventral surface and not projecting beyond tip of lower jaw as much as diameter of eye, but about as much as or less than diameter of pupil.

4*a*. Front of eye at about middle of length from tip of snout to rictus; distance from front of eye to rictus equals length of snout; origin of the dorsal fin from ⅔ to 1 head length behind a vertical through anus; depth 34 to 39; head 8.65 to 9.05; tip of snout to anus 2.43 to 2.7; snout to origin of dorsal fin 2.08 to 2.1; and tail 1.6 to 1.7; all in total length. Depth 3.77 to 4.2; mouth (tip of snout to rictus) 3.66 to 4.36, both in length of head. Snout 1.69 to 2.3 in mouth. Eye 3.5 to 4 in snout. Head 4.15 to 4.3 in tip of snout to origin of dorsal. Head 3.4 to 3.56 in snout to anus. (Length of specimens 106 and 102 mm.) (Fig. 5, *d.*)
Muraenichthys schultzei Bleeker

4*b*. Front of eye much behind middle length of mouth, posterior border of eye over or a trifle behind rictus, distance from front of eye to a vertical through rictus contained two to three times in snout; origin of dorsal fin a little in front of anus to not more than ½ head length behind anus; teeth on maxillary in two rows, sometimes a little irregular; those on vomer in a single row; teeth on dentary uniserial except a few extra near tip of jaw; those on intermaxillary plate in an irregular ring around a slightly enlarged centrally located tooth. The following proportional measurements were computed: Depth 24 to 37; head 8.5 to 10.3; distance from tip of snout to anus 2.26 to 2.48; snout to origin of dorsal 2.2 to 2.49; length of tail 1.68 to 1.79, all in total length. Depth 2.83 to 3.9; mouth 3.32 to 3.9, all in head. Snout 1.34 to 1.6 in mouth. Eye 2.0 to 2.7 in snout. Head 3.6 to 4.3 in distance from snout to origin of dorsal. Head 3.72 to 4.14 in snout to anus. (Fig. 5, *c*.)----------**Muraenichthys laticaudata (Ogilby)**

KAUPICHTHYS, new genus

This new genus differs from all other echelid genera in the dentition; the vomer has two rows of teeth that begin behind the intermaxillary plate, then diverge widely, and finally meet again posteriorly; also the dentary has three pairs of canine teeth near the midline at the front of the jaw, and along the sides of the lower jaw two or three irregular rows anteriorly becoming uniserial posteriorly. The anus is farther forward than on other echelid eels, since it is only one head length behind the gill openings. A diagram of the teeth is shown in figure 5, *i*.

Other characters of the genus are those of the species.

Genotype.—Kaupichthys diodontus, new species.

Named in recognition of the work done on the apodal fishes by Johann Jacob Kaup (1803–1873).

KAUPICHTHYS DIODONTUS, new species

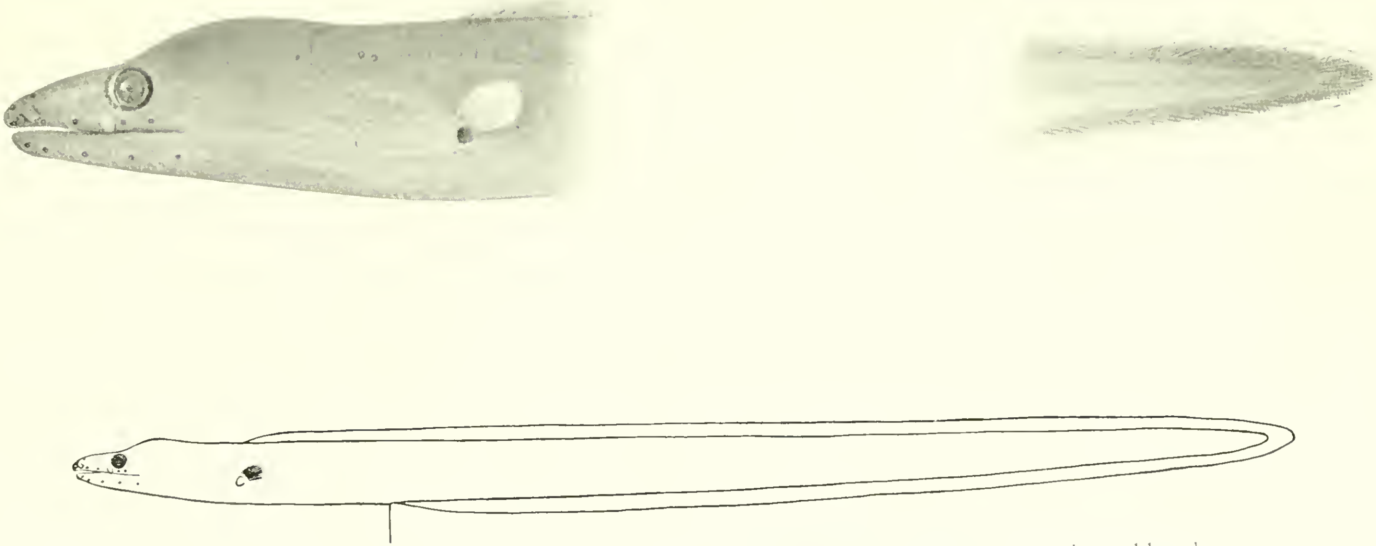
PLATE 6; FIGURE 5, *i*

Holotype.—A specimen 138 mm. in total length (U. S. N. M. No. 115980), collected by Leonard P. Schultz on the reef of Tau Island at Siulagi Point, June 27, 1939. A paratype 92 mm. long (U. S. N. M. No. 115981) was collected by L. P. Schultz on the reef of Rose Island, June 11–14, 1939.

Description.—(Based on the holotype and one paratype, only known specimen. All measurements are given in millimeters, and from these various proportions were computed and recorded in the key, pages 48, 49. Measurements are given for the holotype followed by those for the paratype in parentheses.) Total length 138 (92); length of head 18.4 (12.3); greatest depth of body 7.3 (3.3); distance from tip of snout to anus 36.2 (24.2); snout to origin of dorsal 19.6 (12.1); length of tail 101.8 (67.8); diameter of eye 1.8 (1.1); length of snout 4.5 (3.0); tip of snout to rictus 6.7 (4.7); width of fleshy interorbital space 2.7 (1.7); length of longest caudal fin ray 2.3 (1.7); width of lower jaw below eyes 2.1 (1.4); width of head at eyes 4.5 (2.3); length of pectoral fin 2.7 (1.6).

Pectoral rays 14 on right side of the type.

The anterior nostrils are tubular and occur on the side of the snout near its tip; the posterior nostrils lie in the upper lip under the front



Kaupichthys diodontus, new genus and species: Holotype (U.S.N.M. No. 115980), 138 mm. in total length.

Muraenichthys fowleri, new species: Holotype (U.S.N.M. No. 115972), 104 mm. in total length.

Ichthyocampus diacanthus, new species: Holotype (U.S.N.M. No. 116091), 67.7 mm. in total length. Photograph.

of the eye, the opening covered by a flap of skin; the upper part of the head is more than twice as wide as the narrow lower jaw; near tip of snout are three pairs of pores; there are no pores on dorsal surface of head in front of, between, or behind the eyes; between the two nostrils occur two pores on each side; under the eye are two pores; lateral line pores absent; head, especially obvious on snout, and lips of both jaws are covered with very fine prickles or minute microscopical papillae more or less arranged in rows; gill openings a little below the midaxis of the body; dorsal and anal fins continuous with the caudal fin; anal fin origin immediately behind anus.

Color brown, the dorsal and anal fins pale, grading into white distally; pectoral fin paler than body; caudal fin pale around edges, its middle brownish.

Remarks.—This new species of eel differs from all other forms referred to the family Echelidae in the peculiar dentition of the vomer and front of lower jaw; the vomer has two diverging rows of teeth anteriorly that converge into one posteriorly, and three pairs of canines next to the midline of the lower jaw near its tip, a condition that I have not found in other genera or species of echelid eels. Also there are no pores in front of, between, or behind the eyes on the top of the head as usually found in these eels; the lower jaw is much narrower and there are rows of minute papillae (perhaps associated with microscopical pores) on the head that distinguish this species from all others.

Named *diodontus* in reference to the two rows of teeth on the vomer.

Genus MURAENICHTHYS Bleeker

Muraenichthys BLEEKER, Nat. Tijdschr. Ned. Ind., vol. 4, p. 506, 1853. (Type designated *Muraenichthys gymnopterus* Bleeker, by Bleeker, Ned. Tijdschr. Dierk., vol. 2, p. 117 (5), 1865.)

MURAENICHTHYS MACROPTERUS Bleeker

FIGURE 5, *f*

Muraenichthys macropterus BLEEKER, Soc. Ind. Neerl. Act. (Amboyna) vol. 2, p. 91, 1857.

115982, Canton Island, reef of widest shallow channel, May 13, 1939, 1 specimen, 245 mm.

115985, Canton Island, lagoon, April 23 to May 12, 1939, 12 specimens, 163 to 256 mm.

115984, Canton Island, lagoon, May 23–25, 1939, 24 specimens, 163 to 268 mm.

115983, Tutuila Island, Cocoanut Point, June 4, 1939, 1 specimen, 185 mm.

MURAENICHTHYS FOWLERI, new species

PLATE 7; FIGURE 5, *e*

Holotype.—A specimen 104 mm. in total length (U. S. N. M. No. 115972, collected by Leonard P. Schultz on the reef of Tau Island, at Siulagi Point, June 27, 1939, along with two paratypes measuring 78 and 93 mm. (U. S. N. M. No. 115973). One additional paratype (U. S. N. M. No. 115974) was taken on the reef of Tutuila Island by L. P. Schultz at Alofau, June 3, 1939; it measures 81 mm.

Description.—(Based on the holotype and three paratypes, respectively, as listed above. Measurements for the paratypes are enclosed in parentheses and all measurements are in millimeters, the proportions from these were computed and are presented in the key on page 49.) Total length 104 (78; 93; 81); greatest depth 2.8 (2.2; 2.0; 1.6); length of head 11.2 (8.2; 9.5; 8.5); distance from tip of snout to anus 45 (32.0; 38.8; 35.5); distance from tip of snout to origin of dorsal fin 50 (36; 44; 47); length of snout 2.3 (1.2; 1.2; 1.5); length of mouth (tip of snout to rictus) 3.1 (1.5; 2.4; 2.2); diameter of eye 0.5 (0.3; 0.3; .03); length of tail 59 (45.5); distance from front of eye to rictus 0.8 (0.4; 0.5; 0.5).

Tip of snout acute, flattish on ventral surface, much projecting beyond tip of lower jaw, the projecting part of the snout equal to diameter of the eye; anterior nostrils tubular, located on under side of snout opposite front of lower jaw, the tip of the lower jaw reaches in front of base of anterior nostrils; posterior nostrils in upper lip, their opening under front of eye; 3 pairs of pores on upper surface of the snout; another pair of pores on top of head at rear of eye and a single median one on top of head just behind eyes; a pore close behind upper part of each eye; each upper lip with two pores behind eye one under the eye and three in front of the eye (one of these in front of anterior nostril); lower jaw with five pairs of pores; gill openings located a little closer to the ventral side of the body than the lateral line.

Color in alcohol pale brownish.

Remarks.—This new species differs from other members of the genus *Muraenichthys* in combining the acutely projecting snout, flattish on the ventral surface, with a narrow band of two or three irregular rows of teeth on maxillary, vomer, and front of dentary, with the origin of the dorsal about ½ to 1 head length behind the anus and the front of the eye behind the middle of the mouth.

Named *fowleri* in honor of Henry W. Fowler, of the Academy of Natural Sciences of Philadelphia, who has published more than anyone else on the fishes of Oceania.

MURAENICHTHYS SCHULTZEI Bleeker

FIGURE 5, *d*

Muraenichthys schultzei BLEEKER, Nat. Tijdschr. Ned. Ind., vol. 13, p. 366, 1857.

115986, Canton Island, reef at ocean, April 25–28, 1939, 1 specimen, 102 mm.

115987, Canton Island, reef of widest shallow channel, May 13, 1939, 1 specimen, 106 mm.

MURAENICHTHYS LATICAUDATA (Ogilby)

FIGURE 5, *c*

Myropterura laticaudata OGILBY, Proc. Linn. Soc. New South Wales, vol. 22, p. 247, 1897.

Muraenichthys cookei FOWLER, Fishes of Oceania, p. 41, fig. 9, 1928.

115978, Rose Island, lagoon, June 12 to 20, 1939, 1 specimen. 187 mm.

115979, Swains Island, reef, May 3–9, 1939, 4 specimens 114 to 162 mm. A female, 120 mm. long, contains mature eggs that are loose in the body cavity. The eggs measure about 1 mm. in diameter.

115975 Tutuila Island, Fagasa Bay, rock pools, June 5, 1939, 3 specimens, 113, 123, and 130 mm.

115977, Rose Island, reef, June 11–14, 1939, 19 specimens, 71 to 132 mm. The 132-mm. female contains eggs, about 1 mm. in diameter, loose in the body cavity.

115976, Tau Island, reef at Siulagi Point, June 27, 1939, 3 specimens, 76 to 215 mm.

Order INIOMI

Family SYNODONTIDAE

Genus SYNODUS Scopoli

Synodus [Gronovius, Zoophylacii Gronoviani . . ., vol. 1, p. 112, 1763] SCOPOLI, Introductio ad historiam naturalem . . ., p. 449, 1777.—MEUSCHEN, Museum Gronovianum . . ., p. 35, 1778.—BLOCH, *in* Schneider, Systema ichthyologiae . . ., p. 396, 1801. (Type, *Esox synodus* Linnaeus.)

SYNODUS VARIEGATUS (Lacepède)

Salmo variegatus LACEPÈDE, Histoire naturelle des poissons, vol. 5, p. 157, pl. 3, fig. 3, 1803.

115412, Rose Island, reef, June 11–14, 1939, 1 specimen.

115409, Rose Island, lagoon, June 12–20, 1939, 1 specimen.

115408, Canton Island, lagoon, April 23 to May 12, 1939, 1 specimen.

115411, Canton Island reef of widest shallow channel, May 13, 1939, 1 specimen.

115410, Tutuila Island, reef at Alofau, June 3, 1939, 1 specimen.

115407, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 3 specimens.

115406, Tau Island, reef at Siulagi Pt., June 27, 1939, 4 specimens.

52457, Apia, Samoa, Jordan and Kellogg, 1 specimen.

Genus SAURIDA Valenciennes

Saurida VALENCIENNES, *in* Cuvier and Valenciennes, Histoire naturelle poissons, vol. 22, p. 499, 1849. (Type *Salmo tumbil* Bloch.)

SAURIDA GRACILIS (Quoy and Gaimard)

Saurus gracilis QUOY and GAIMARD, Voyage autour du monde . . . *Uranie*, Poissons, p. 224, 1824.

115405, Rose Island, reef, June 11–14, 1939, 2 specimens.

115404, Rose Island, lagoon, June 12–20, 1939, 4 specimens.

52295, Apia, Samoa, Jordan and Kellogg, 1 specimen.

Order SYNENTOGNATHI

Family SCOMBERESOCIDAE

Genus COLOLABIS Jordan and Evermann

Cololabis (Gill) Jordan and Evermann, U. S. Nat. Mus. Bull. 47, p. 726, 1896. (Type, *Scombresox brevirostris* Peters.)

COLOLABIS SAIRA (Brevoort)

Scomberesox saira Brevoort, *in* Perry, Narrative of the expedition of an American squadron to the China seas and Japan . . . 1852–54, p. 281, pl. 7, fig. 4, on a drawing, 1856.

Cololabis saira (Brevoort) Schultz, Copeia, 1940, No. 4, p. 270.

115202, latitude 27°02′30″ N., longitude 132°51′ W., 1 specimen.

115201, latitude 22°24′ N., longitude 144°53′ W., 4 specimens.

There are in the National Museum a few specimens of this species taken near the Hawaiian Islands by the *Albatross*.

Family BELONIDAE

Genus BELONE Cuvier

Belone Cuvier, Règne animal, ed. 1, p. 185, 1817. (Type, *Esox belone* Linnaeus.)

BELONE PLATYURA Bennett

Belone platyura Bennett, Proc. Zool. Soc. London, 1831, pt. 1, p. 168.

After measuring a large series of specimens of the large-eyed form *Belone platyura* and many of the small-eyed form named by Günther *B. persimilis*, I am of the opinion that when small this species has a small eye and when larger the eye is much larger in proportion.

115279, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 1 specimen.

115278, Tutuila Island, reef at Alofau, June 3, 1939, 1 specimen.

115281, Swains Island reef, May 3–9, 1939, 1 specimen.

115283, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 3 specimens.

115280, Rose Island reef, latitude 14°32′51.91″ S., longitude 168°08′33.70″ W., June 11–14, 1939, 52 specimens.

115282, Hull Island reef, July 12–15, 1939, 1 specimen.

52527, Apia, Samoa, 1 specimen.

Genus TYLOSURUS Cocco

Tylosurus Cocco, Giorn. Sci. Lett. Art. Sicilia, vol. 42, No. 124, 1833. (Type, *Tylosurus cantraini* Cocco.)

TYLOSURUS INCISA (Valenciennes)

Belone incisa Valenciennes, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 18, p. 451, 1846.

52364, Apia, Samoa, Jordan and Kellogg, 2 specimens.

TYLOSURUS INDICA (Lesueur)

Belone indica LESUEUR, Journ. Acad. Nat. Sci. Philadelphia, vol. 2, pt. 1, p. 130, 1821.

52366, Apia, Samoa, Jordan and Kellogg, 1 specimen.

Genus ABLENNES Jordan and Fordice

Athlennes JORDAN and FORDICE, Proc. U. S. Nat. Mus., vol. 9, p. 342, 1886. [Type, *Belone hians* Cuvier and Valenciennes, changed to *Ablennes* (*Athlennes* is a misprint) by Internat. Comm. Nomencl.]

ABLENNES HIANS (Valenciennes)

Belone hians VALENCIENNES, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 18, p. 432, pl. 548, 1846.

Walford's type of *Ablennes pacificus* in the U. S. National Museum is based on a very poorly preserved specimen, and the differences pointed out by him probably will not hold good when better specimens from the same locality are studied. My single specimen does not appear to differ from Atlantic specimens.

115197, off Enderbury Island, July 20, 1939, Lt. T. D. Shriver, U. S. N., 1 specimen, 1,020 mm. in standard length.

Family HEMIRAMPHIDAE

KEY TO THE HEMIRAMPHIDAE FROM THE PHOENIX AND SAMOAN ISLANDS

1*a*. Teeth posteriorly in both jaws tricuspid; scales about 5½+53+2, and about 30 in front of dorsal; gill rakers 8+24; dorsal soft rays about 13 (11 branched); anal 11 (9 branched); intermaxillary plate ⅔ broader than long; depth of preorbital bone equal to its length and twice in eye; preorbital bone equal to length of intermaxillary plate; pelvics closer to end of hyperal plate than head by a distance equal to length of snout; about four to nine equidistant black blotches on each side of body dorsally.
Hyporhamphus far (Forskål)

1*b*. Teeth simple.

2*a*. Length of preorbital bone 1.9 times in "intermaxillary" plate 1.7 in eye, and its depth about equal to its length; intermaxillary plate a trifle longer than broad (including wings); scales about 6½+59 to 65+2 and about 36 to 40 before dorsal; gill rakers 9 or 10+25 to 29; dorsal rays 16 or 17 (14 or 15 branched); anal 14 or 15 (12 or 13 branched); pelvic insertion equidistant between base of pectoral and end of hypural; in adults teeth occur on upper surface of beak and in half grown only in patches laterally, absent in young.
Odontorhamphus chancellori Weed

2*b*. Length of preorbital bone longer than length of intermaxillary plate or 1⅕ of it, 1.2 times in eye, and its depth 1.5 in its length; intermaxillary plate a little broader than long; scales about 40 or 41 before dorsal; scales 6+69 or 70+2; dorsal rays 15 (13 branched); anal 18 or 19 (16 or 17 branched); gill rakers 9+24; insertion of pelvics a trifle closer to head than end of hypural plate; pectoral 11.
Hemirhamphus pacificus Steindachner

2c. Length of preorbital bone a trifle shorter than length of intermaxillary plate or 8 to 9 of it, 2.1 times in eye, and its depth equal to its length; length of intermaxillary plate 1.4 in its width or broader than long; scales about 4½ or 5½+57+1 or 2; about 36 scales before dorsal; gill rakers 10+29; dorsal rays 14 to 16 (12 to 13 branched); anal 13 to 15 (12 to 14 branched); pectoral about 12; origin of dorsal over rear edge of anus; pelvic insertion a trifle closer to head than posterior edge of hypural plate; no teeth on upper surface of beak in front of mouth________________________Hemirhamphus affinis Günther

Genus HYPORHAMPHUS Gill

Hyporhamphus Gill, Proc. Acad. Nat. Sci. Philadephia, 1859, p. 131. (Type, *Hyporhamphus tricuspidatus* Gill.)

HYPORHAMPHUS FAR (Forskål)

Esox far Forskål, Descriptiones animalium . . ., pp. 13, 67, 1775.

83270, Samoa, Wilkes Exploring Expedition, 1 specimen.
83325, Fiji ?, 2 specimens.

Genus ODONTORHAMPHUS Weed

Odontorhamphus Weed, Field Mus. Nat. Hist. Zool. Ser., vol. 20, pp. 47, 51, 1933. (Type, *Odontorhamphus chancellori* Weed.)

ODONTORHAMPHUS CHANCELLORI Weed

Odontorhamphus chancellori Weed, Field Mus. Nat. Hist. Zool. Ser., vol. 20, p. 52, fig. 1, 1933.

115207, Swains Island, reef, May 4, 1939, 1 specimen.
115206, Hull Island, channel, July 7–17, 1939, 1 specimen.
115208, Hull Island, reef, July 12–15, 1939, 11 specimens.
115209, Rose Island, reef, June 11–14, 1939, 51 specimens.

Genus HEMIRHAMPHUS Cuvier

Hemi-Rhamphus Cuvier, Règne animal, ed. 1, p. 186, 1817. (Type, *Esox brasiliensis* Linnaeus.)

HEMIRHAMPHUS PACIFICUS Steindachner

Hemirhamphus pacificus Steindachner, Denkschr. Akad. Wiss. Wien, vol. 70, p. 511, 1901.

52530, Pago Pago, Samoa, Jordan and Kellogg, 2 specimens.

HEMIRHAMPHUS AFFINIS Günther

Hemirhamphus affinis Günther, Catalogue of the fishes of the British Museum, vol. 6, p. 267, 1866.

115205, Tutuila Island, Pago Pago Bay, June 7, 1939, 2 specimens.
115204, Tutuila Island, reef at Alofau, June 3, 1939, 3 specimens.
115203, Tutuila Island, reef at Pagai, June 4, 1939, 2 specimens.
52346, Pago Pago, Samoa, Jordan and Kellogg, 8 specimens.

Family EXOCOETIDAE

A workable key to the flyingfishes of Oceania must await a review of this group. The series at hand is not large enough to determine the variability of certain forms.

The observations recorded in table 4 were made on the flight of flyingfishes at about latitude 19° N., longitude 153° W., at latitude 10° N., longitude 165° W., and at about latitude 2° N., longitude 169° W. The length of time was determined by means of a stop watch. The length of the flights that lasted about 14 seconds was nearly twice the length of the ship, or 650 to 700 feet.

Genus CYPSILURUS Swainson

Cypsilurus (spelling changed to *Cypselurus* by Int. Comm. Nom.; in my opinion this change was in error) Swainson, The natural history and classification of fishes . . ., vol. 1, p. 299, 1838. (Type, *Cypsilurus appendiculatus* Wood.)

CYPSILURUS ATRISIGNIS Jenkins

Cypsilurus atrisignis Jenkins, U. S. Fish Comm. Bull., vol. 22 (1902), p. 436, pl. 3, 1903.

115275, latitude 14°54′ N., longitude 161°51′ W., April 19, 1939, 1 specimen, sailed on deck of *Bushnell* about 16 feet above the sea.

115274, latitude 7° N., longitude 167° W., April 20, 1939, 1 specimen, sailed on boat deck, 9 p. m., about 32 feet above the sea.

115273, latitude 1° N., longitude 170° W., April 23, 1939, 1 specimen, sailed through porthole at 2 a. m. and landed on bunk of Mr. De Maris.

CYPSILURUS ALTIPENNIS (Valenciennes)

Exocoetus altipennis Valenciennes, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 19, p. 109, pl. 560, 1846.

115277, latitude 10° N., longitude 165° W., April 20, 1939, 1 specimen, sailed on *Bushnell* at night.

CYPSILURUS POECILOPTERUS (Valenciennes)

Exocoetus poecilopterus Valenciennes, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 19, 112, pl. 561, 1846.

52358, Pago Pago, Samoa, Jordan and Kellogg, 1 specimen.

Table 4.—*Data on flight of* Cypsilurus

Number of take-offs for each flight	Length of flight in seconds													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	7	4	----	3	2	2	----	----	----	----	----	----	----	----
2	3	2	1	3	3	3	1	2	----	----	----	----	----	----
3	----	----	----	1	1	----	1	----	3	2	----	----	----	----
4	----	----	----	----	----	----	----	----	----	----	----	1	----	2
5	----	----	----	----	----	----	----	----	----	1	----	----	----	1
6	----	----	----	----	----	----	----	----	----	----	----	----	----	----
7	----	----	----	----	----	----	----	----	----	----	----	----	----	----
8	----	----	----	----	----	----	----	----	----	----	----	1	----	----
9	----	----	----	----	----	----	----	1	----	----	----	----	----	----

CYPSILURUS SPILONOPTERUS (Bleeker)

Exocoetus spilonopterus Bleeker, Atlas ichthyologique . . ., vol. 6, pl. 249, fig. 2, 1866–72.

I identify our specimen as this species on the basis of Bleeker's figure.

52348, Apia, Samoa, Jordan and Kellogg, 1 specimen.

Genus DANICHTHYS Bruun

Danichthys Bruun, Journ. Linn. Soc. London, Zool., vol. 39, p. 135, 1934. (Type, *Danichthys rondeletii* Cuvier and Valenciennes.)

DANICHTHYS GILBERTI (Snyder)

Exonautes gilberti Snyder, Bull. U. S. Fish Comm., vol. 22 (1902), p. 522, pl. 7, fig. 13, 1903.

The two specimens listed below agree in most respects with the type of *gilberti* Snyder; the dorsal fin of *gilberti* is a little more in advance, origin is under the base of the second dorsal ray, and the head and eye are a little smaller in *gilberti*.

115276, latitude 10° N., longitude 165° W., April 20, 1939, 1 specimen, sailed on *Bushnell* at night. This specimen has the following characteristics: Origin of dorsal fin over the third anal ray, head 2.5 times in distance from tip of snout to insertion of pelvic fins and 4.1 times in standard length; insertion of pelvics to base caudal fin 2.4 times in standard length; eye four times in distance from head to base of pelvics; pectoral rays 18, first two unbranched; dorsal 11, anal 12; scales about 49; gill rakers 8+20; upper rays of pectoral blackish but the center of the fin is hyaline; wide submarginal black band distally on pectorals, the very rear edge of this fin hyaline; caudal fin blackish no white margins; second, third and fourth rays of pelvics blackish in basal half.

92584, Apia, Samoa, Jordan and Kellogg, 1 specimen. This specimen is intermediate in color between the one described and *D. gilberti* (Snyder). The dorsal rays are 11, anal 13.

The following notes are taken from the type of *D. gilberti* (Snyder): Origin of dorsal fin over the anus, origin of anal under the second dorsal ray; head 2.8 times in distance from tip of snout to insertion of pelvic fins and 4.7 times in standard length; insertion of pelvics to base of caudal fin 2.5 times in standard length; eye 5.1 times in distance from head to base of pelvics; pectoral rays 18; dorsal 10; anal 10; scales 50; gill rakers 7+22; pectoral fin blackish, the color more intense distally, posterior margin of pectoral hyaline; caudal fin blackish the posterior margin hyaline; upper surface of pelvic rays blackish.

Order HETEROSOMATA

Family BOTHIDAE

An excellent key to this group of fishes is given by Norman (A Systematic Monograph of the Flatfishes: Heterosomata, vol. 1, pp. 171–172, 1934), and with my limited number of specimens I can now add nothing of importance.

Genus BOTHUS Rafinesque

Bothus Rafinesque, Caratteri di alcuni nuovi generi e nuove specie di animali e piante della Sicilia, p. 23, 1810. (Type, *Bothus rumolo* Rafinesque.)

BOTHUS MANCUS (Broussonet)

Pleuronectes mancus Broussonet, Ichthylogia . . ., [no pagination], pl., 1782.

An adult female, 257 mm. in standard length, with eggs about 1 mm. in diameter, has the upper rays of the pectoral elongated and a spine on the snout and one on the upper margin of the eye.

Table 5 records counts made on specimens of *Bothus mancus* from the collections listed below.

115218, Canton Island, lagoon, May 23–26, 1939, 2 specimens.
115221, Rose Island, reef, June 11–14, 1939, 3 specimens.
115222, Canton Island, lagoon, April 23 to May 12, 1939, 1 specimen.
115220, Swains Island, reef, May 3–9, 1939, 1 specimen.
115219, Canton Island, reef on ocean side, April 25–28, 1939, 1 specimen.
115217, Hull Island, channel, July 8–12, 1939, 10 specimens.
115216, Tau Island, reef at Siulagi Point, June 27, 1939, 2 specimens.
52500, Apia, Samoa, Jordan and Kellogg, 2 specimens.

BOTHUS PANTHERINUS (Rüppell)

Rhombus pantherinus Rüppell, Atlas zu der Reise im nördlichen Afrika, Fische, p. 121, pl. 3, fig. 1, 1828.

115215, Canton Island, lagoon, May 23 to 26, 1939, 5 specimens.
115213, Canton Island, lagoon, April 23 to May 12, 1939, 2 specimens.
115214, Hull Island, channel, July 8–12, 1939, 1 specimen.
52501, Apia, Samoa, Jordan and Kellogg, 2 specimens.

Table 5.—*Counts made on specimens of* Bothus

Species	Dorsal rays															Anal rays												
	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	68	69	70	71	72	73	74	75	76	77	78	79	80
mancus									1	1	1	2			1								1	1	1	3	1	1
pantherinus	1	1	1	1	1											2	3				1							

Species	Gill rakers on lower first arch						Articulated rays in pectoral		
	7	8	9	10	11	12	9	10	11
mancus				2	8	1		1	4
pantherinus	5	2					3	1	

Family SOLEIDAE

A small sole, 45 mm. in total length and 35 mm. in standard length, was taken in a channel on Hull Island. This specimen has 73 dorsal rays, 51 anal, and 70 scales from gill opening to base of caudal fin rays. It may be a specimen of *Aseraggodes melanostictus* (Peters).

115223, Hull Island, channel, July 8-12, 1939, 1 specimen.

Order BERYCOIDEI

Family HOLOCENTRIDAE

KEY TO GENERA OF HOLOCENTRIDAE FROM PHOENIX AND SAMOAN ISLANDS

1*a*. Preopercle without a conspicuous spine at lower angle.
  2*a*. Scales strongly ctenoid; dorsal spines X–I; opercle with one spine at upper angle________ Myripristis Cuvier
  2*b*. Scales very rough and spiny; dorsal spines XII, opercle with two or three spines at upper angle________ Holotrachys Günther
1*b*. Preopercle with a strong backward-projecting spine at lower angle; opercle with two spines at upper angle________ Holocentrus Scopoli

My study of the family Holocentridae indicates that it is in need of careful revision. When this is done the names that I have applied to the species found in the Phoenix and Samoan Islands may have to be changed.

Genus MYRIPRISTIS Cuvier

Myripristis Cuvier, Règne animal, ed. 2, vol. 2, p. 150, 1829. (Type, *Myripristis jacobus* Cuvier and Valenciennes.)

In studying the genus *Myripristis* I have found that Jordan and Evermann, Jordan and Seale, Günther, and others failed completely to distinguish between the various species of this genus in the Hawaiian and Samoan Islands. The diagnoses of various species by Jordan and his coworkers are of little value because in most of the jars identified by them I have found two to four species mixed. Further, it is highly probable that many of the cotypes that have been distributed to several museums are of different species than the types, so inadequate was the understanding of the species in this genus by its earlier describers.

It will not be possible to untangle the various names used for the species in this genus until the types of several species are examined in European museums.

KEY TO THE GENUS MYRIPRISTIS (see table 6)

1*a*. Dorsal rays X–I, 16 or 17 (usually 17); anal IV, 15 or 16; gill rakers on first gill arch 10 to 12 + 1 + 22 to 26 = 34 to 38; scale rows between upper gill opening and base of caudal fin rays 42 to 44; rear border of opercle blackish, pigment extending down to opposite upper edge of pectoral base; shoulder blackish under edge of opercle, this band joining with black in axil of pectoral; caudal fin sometimes dusky.
Myripristis multiradiatus Günther
1*b*. Dorsal soft rays 14 to 16 (very rarely 16); anal rays 12 to 15 (very rarely 15).

2*a*. Posterior margins of soft rays of dorsal, anal, and caudal fins with a wide blackish band; dorsal rays X–I, 14 or 15; anal IV, 13; gill rakers on first gill arch 12 or 13+1+25 or 26=38 to 40; scales 31 to 34; outer membrane of spinous dorsal blackish; upper half of axil of pectoral blackish; around opercular spine a black blotch; no black on shoulder girdle________________________________ Myripristis adustus Bleeker

2*b*. Posterior margin of caudal fin plain in color without a wide black band.

3*a*. Anterior border of soft dorsal and anal fins white, then a blackish area submarginally, pigment more intense distally on first few rays; gill rakers on first gill arch totaling 43 to 48; gill raker formula 14 or 15+1+28 to 31; dorsal rays X–I, 14; anal IV, 12; scale rows between upper gill opening and base of caudal fin 33 to 35; rear margin of opercle blackish; axil of pectoral blackish; upper and lower edges of caudal fin not pigmented; two or three upper rows of scales lack brownish-black pigment around their posterior margins.
Myripristis murdjan (Forskål)

3*b*. Anterior border of soft dorsal and anal with blackish margin, but very front edge of fin not white as in *murdjan;* gill rakers on first gill arch usually 13 or fewer+1+29 or fewer.

4*a*. Anterior border of soft dorsal and anal fins not white as in *murdjan* and sharply contrasting with blackish next few rays, but in this species the black extends to front edges of fins and is of about equal intensity on outer ⅔ of fins; outer two or three rays, dorsally and ventrally, of caudal fin blackish, more intense distally (the black pigment in some specimens is very pale and in certain old ones entirely faded); margin of opercle blackish to upper edge of pectoral base; axil of pectoral black with lower half of axil white in contrast to upper; spinous dorsal pale; gill rakers on first gill arch 11 to 13 (rarely 13)+1+22 to 27 (rarely 26 or 27)=34 to 40 (rarely 40); dorsal rays X–I, 14 or 15; anal IV, 12 or 13; scales 31 to 34______________ Myripristis berndti Jordan and Evermann

4*b*. Anterior edges of soft dorsal and anal fins not white as in *murdjan* and sharply contrasting with blackish next few rays, but black pigment extends to front edges of fins and is of about equal intensity on outer ⅔ of fins; upper dorsal and lower ventral rays of caudal fin pigmented, this grayish pigment extending farther posteriorly than in *berndti;* the blackish pigment appears to be more intense in 2- or 3-inch specimens than in those 6 or 8 inches long; and in the type of *M. argyromus* the color has faded altogether; margin of opercle blackish; axil of pectoral blackish; spinous dorsal pale; gill rakers on first gill arch 10 or 11+1+24 to 26=36 to 39; dorsal rays X–I, 15; anal IV, 13 or 14 (rarely 14); scales 35 to 37.
Myripristis argyromus Jordan and Evermann

4*c*. Anterior edges of soft dorsal and anal fins not white as in *murdjan* and sharply contrasting with blackish next few rays, but blackish pigment extends to front edges of fins and is of about equal intensity on outer ⅔ of fins; upper and lower rays of caudal fin without blackish pigment; large specimens appear to be paler than those 2 to 4 inches long; rear margin of opercle blackish around spine and dorsally but pigment does not extend down to pectoral fin base; axil of pectoral blackish, lower half of axil paler; gill rakers 11 or 12+1+24 or 25=37 or 38; dorsal rays X–I, 15, anal IV, 14 or 15; scales 39 to 43_________ Myripristis sanguineus Jordan and Seale

3c. First few rays of soft dorsal and anal without blackish pigment.
  5a. Gill rakers on first gill arch 13 to 15+1+27 to 29=42 to 45; dorsal rays X–I, 15 or 16; anal rays IV, 13 or 14; scales 30 to 33; axil of pectoral blackish in upper half, white below; upper three rows of scales with their posterior borders brownish, contrasting with pale centers; opercular margin only dusky, not blackish as in some other species____________________ Myripristis microphthalmus Bleeker
  5b. Gill rakers on first gill arch 10 or 11+1+20 to 23=31 to 36; dorsal rays X–I, 14; anal IV, 12 or 13; scales 38 to 41; axil of pectoral with some black pigment; opercular margin dusky to blackish (the four types may be the same species as *argyrosomus*, but they have fewer gill rakers on upper half of gill arch).
Myripristis clarionensis Gilbert

MYRIPRISTIS MULTIRADIATUS Günther

Myripristis multiradiatus GÜNTHER, Journ. Mus. Godeffroy, vols. 2–3, pts. 5–6, p. 93, 1873.

115247, Tutuilla Island, reef at entrance Pago Pago Bay, June 2, 1939, 5 specimens.
109894, Jordan and Kellogg, 3 specimens.
56990, Apia, Samoa, 5 specimens.
56989, Apia, Samoa, 3 specimens.
52386, Apia, Samoa, Jordan and Kellogg, 5 specimens.
109893, Apia, Samoa, Jordan and Kellogg, 8 specimens.
109892, Samoa, Wilkes Exploring Expedition, 1 specimen.

Color in life, from notes taken on a specimen collected from the reef at Pago Pago: Body brilliant red above, lighter below; spiny dorsal orange-red; pectorals pink; all other fins more brilliant red than body, pelvic spine white; cheeks and anterior part of body iridescent blue; brownish bar across opercle to base of pectorals; tip of soft dorsal brighter red than rest of fin; eye blackish above pupil.

MYRIPRISTIS ADUSTUS Bleeker

Myripristis adustus BLEEKER, Nat. Tidjschr. Ned. Ind., vol. 4, p. 108, 1853.

115246, Hull Island, reef, July 12 to 15, 1939, 1 specimen.
52404, Apia, Samoa, Jordan and Kellogg, 2 specimens.

MYRIPRISTIS MURDJAN (Forskål)

Sciaena murdjan FORSKÅL, Descriptiones animalium . . . , pp. xii, 48, 1775.

There is considerable misunderstanding concerning the species usually referred to *M. murdjan* Forskål and *M. intermedia* Günther. Rüppell (Atlas zu der Reise im nördlichen Afrika, Fische, pp. 86, 87, pl. 23, fig. 2) gives a fair description and a good figure of *murdjan.* Bleeker (Atlas ichthyologique . . . , pl. 360, fig. 3) figures the same species that Rüppell figured. But Günther's figure (Journ. Mus. Godeffroy, vols. 2–3, p. 92, pl. 61, 1873) of *M. murdjan* does not represent the same species as that of Rüppell and of Bleeker but an entirely different one. The only species that I have encountered with the anterior margins of the soft dorsal and anal fins white and with blackish pigment submarginally on the first few rays, more intense distally, as shown by Rüppell and by Bleeker, has a larger number of gill rakers than I have found on any other species from the Phoenix, Samoan, and Hawaiian Islands. For this species I propose to retain the name *M. murdjan* as used by Rüppell and Bleeker and now for the first time keyed out. Probably Günther's *M. intermedia* is Forskål's *murdjan*, and Günther's *M. murdjan*, pl. 61, is certainly another species.

115263, Rose Island, reef, June 11 to 14, 1939, 2 specimens.
115262, Hull Island, reef, July 12–15, 1939, 2 specimens.
115264, Swains Island, reef, May 3–9, 1939, 14 specimens.
115260, Hull Island, reef, July 13, 1939, 5 specimens.
115261, Enderbury Island, reef, May 15–19, 1939, 4 specimens.
52397, Apia, Samoa, Jordan and Kellogg, 1 specimen.

MYRIPRISTIS BERNDTI Jordan and Evermann

Myripristis berndti JORDAN and EVERMANN, Bull. U. S. Fish Comm., vol. 22 (1902), p. 170, 1903.

115244, Tutuila Island, reef at entrance of Pago Pago Bay, June 2, 1939, 3 specimens.

115243, Tutuila Island, reef at Pagai, June 4, 1939, 1 specimen.
115245, Rose Island, lagoon, June 12 to 20, 1939, 1 specimen.

50627 (type of *Myripristis berndti* Jordan and Evermann), Hilo, Hawaii, A. M. Wilson.

82950, Samoa, Wilkes Exploring Expedition, 3 specimens.
109929, Apia, Samoa, Jordan and Kellogg, 1 specimen.
52370, Apia, Samoa, Jordan and Kellogg, 1 specimen.
109931, Apia, Samoa, Jordan and Kellogg, 6 specimens.
52412, Apia, Samoa, Jordan and Kellogg, 3 specimens.
82941, Samoa, Wilkes Exploring Expedition, 1 specimen.
34809, Apia, Samoa, W. H. Jones, 2 specimens.
109930, Apia, Samoa, Jordan and Kellogg, 3 specimens.

MYRIPRISTIS ARGYROMUS Jordan and Evermann

Myripristis argyromus JORDAN and EVERMANN, Bull. U. S. Fish Comm., vol. 22 (1902), p. 172, 1903.

115241, Tau Island, reef at Siulagi, June 27, 1939, 1 specimen.
115242, Hull Island reef, July 12–15, 1939, 12 specimens.
50631 (type of *Myripristis argyromus* Jordan and Evermann), Hilo, Hawaii.

50632 (type of *Myripristis symmetricus* Jordan and Evermann). The type has but 13 soft rays in the anal fin, Hilo, Hawaii.

109928, Samoa, Wilkes Exploring Expedition, 1 specimen.
109926, Apia, Samoa, Jordan and Kellogg, 1 specimen.

MYRIPRISTIS SANGUINEUS Jordan and Seale

Myripristis sanguineus JORDAN and SEALE, Bull. U. S. Bur. Fish., vol. 25, p. 221, fig. 24, 1906.

51721 (type of *M. sanguineus* Jordan and Seale); dorsal rays X–I, 15, anal IV, 14, and not as stated in original description; Apia, Samoa, Jordan and Kellogg.
109924, Apia, Samoa, Jordan and Kellogg, 1 specimen.
109925, Apia, Samoa, Jordan and Kellogg, 1 specimen.
52207, Apia, Samoa, Jordan and Kellogg, 3 specimens.

Myripristis murdjan in Günther's "Andrew Garrett's Fische der Südsee," pl. 61, 1873, obviously is this species.

MYRIPRISTIS MICROPHTHALMUS Bleeker

Myripristis microphthalmus Bleeker, Nat. Tijdschr. Ned. Ind., vol. 3, p. 261, 1852.

115248, Hull Island, channel, July 7–17, 1939, 1 specimen.
109927, Samoa, Wilkes Exploring Expedition, 2 specimens.
52390, Apia, Samoa, Jordan and Kellogg, 7 specimens.

MYRIPRISTIS CLARIONENSIS Gilbert

Myripristis clarionensis Gilbert, Proc. U. S. Nat. Mus., vol. 19, p. 441, pl. 69, 1897.

I have examined the types in the National Museum of *M. clarionensis* Gilbert, *M. sealei* Jenkins, and *M. chryseres* Jordan and Evermann and a cotype of the last and am convinced they are the same species unless the study of large series reveals distinctions not now found. These three species are very close to *M. argyromus* Jordan and Evermann but appear to differ from that form in having fewer gill rakers on the upper half of the first gill arch. The following types were studied:

47746 (type of *M. clarionensis* Gilbert), Clarion Island, *Albatross*.
50708 (type of *M. sealei* Jenkins), Honolulu, 1889, O. J. Jenkins.
50629 (type of *M. chryseres* Jordan and Evermann), Hilo, Hawaii.
50630 (cotype of *M. chryseres* Jordan and Evermann), Hilo, Hawaii.

Table 6.—*Counts made on various species of* Myripristis

Species	Number of soft fin rays									Number of transverse scale rows from upper gill opening to base of caudal fin rays													
	Dorsal				Anal																		
	14	15	16	17	12	13	14	15	16	31	32	33	34	35	36	37	38	39	40	41	42	43	44
multiradiatus	---	---	4	13	---	---	---	10	7	---	---	---	---	---	---	---	---	---	---	---	2	---	1
murdjan	16	---	---	---	16	---	---	---	---	---	---	2	4	5	---	---	---	---	---	---	---	---	---
microphthalmus	---	7	2	---	---	9	1	---	---	3	5	1	---	---	---	---	---	---	---	---	---	---	---
sanguineus	---	6	---	---	---	---	5	1	---	---	---	---	---	---	---	---	---	1	3	---	1	1	---
berndti	24	5	---	---	20	9	---	---	---	3	4	13	2	---	---	---	---	---	---	---	---	---	---
adustus	1	2	---	---	---	3	---	---	---	1	1	---	1	---	---	---	---	---	---	---	---	---	---
argyromus	---	11	---	---	---	8	1	---	---	---	---	---	---	1	5	2	1	---	---	---	---	---	---
clarionensis	4	---	---	---	3	1	---	---	---	---	---	---	---	---	---	---	1	1	1	1	---	---	---

TABLE 6.—*Counts made on various species of* Myripristis—Continued

Species	Number of gill rakers on first gill arch																		
	Upper arch						At angle	Lower arch											
	10	11	12	13	14	15	1	20	21	22	23	24	25	26	27	28	29	30	31
multiradiatus	1	3	1	---	---	---	5	---	---	1	2	---	---	2	---	---	---	---	---
murdjan	---	---	---	---	9	3	12	---	---	---	---	---	---	---	---	5	---	5	2
microphthalmus	---	---	---	1	6	1	8	---	---	---	---	---	---	---	2	3	3	---	---
sanguineus	---	---	3	1	---	---	4	---	---	---	---	2	2	---	---	---	---	---	---
berndti	---	8	12	2	---	---	22	---	---	2	4	6	8	1	1	---	---	---	---
adustus	---	---	2	1	---	---	3	---	---	---	---	---	1	2	---	---	---	---	---
argyromus	2	3	3	---	---	---	8	1	1	---	---	3	1	2	---	---	---	---	---
clarionensis	2	2	---	---	---	---	4	1	---	2	1	---	---	---	---	---	---	---	---

Species	Total number of gill rakers																	
	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
multiradiatus	---	---	---	1	1	1	2	1	---	---	---	---	---	---	---	---	---	---
murdjan	---	---	---	---	---	---	---	---	---	---	---	---	5	1	2	2	1	1
microphthalmus	---	---	---	---	---	---	---	---	---	---	---	1	6	---	1	---	---	---
sanguineus	---	---	---	---	---	---	1	3	---	---	---	---	---	---	---	---	---	---
berndti	---	---	---	1	3	2	10	3	2	1	---	---	---	---	---	---	---	---
adustus	---	---	---	---	---	---	---	1	1	1	---	---	---	---	---	---	---	---
argyromus	1	1	---	---	---	4	---	1	2	---	---	---	---	---	---	---	---	---
clarionensis	1	---	2	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---

Genus HOLOTRACHYS Günther

Holotrachys GÜNTHER, Andrew Garrett's Fische der Südsee, vol. 1, p. 93, 1873. (Type, *Myripristis lima* Cuvier and Valenciennes.)

HOLOTRACHYS LIMA (Cuvier and Valenciennes)

Myripristis lima CUVIER and VALENCIENNES, Histoire naturelle des poissons, vol. 7, p. 493, 1831.

52415, Apia, Samoa, Jordan and Kellogg, 3 specimens.

Genus HOLOCENTRUS Scopoli

Holocentrus SCOPOLI, Introductio ad historiam naturalem, p. 449, 1777. (No type designated, but after Gronow's *Holocentrus maxilla.*)

See table 7 for counts made on various species in this genus.

KEY TO THE SPECIES OF HOLOCENTRUS FROM THE PHOENIX AND SAMOAN ISLANDS

1*a*. Dorsal rays X–I, 12 or 13; anal IV, 8 or 9 (eleventh dorsal spine forms a part of second dorsal fin.)

  2*a*. Dorsal rays X–I, 13; anal IV, 9; scale rows from upper edge of gill opening to base of caudal fin rays 41 or 42; gill rakers 6 or 7+1+10 or 11; lower jaw projecting, entering profile; maxillary ending under pupil; spinous dorsal with wide black band, tips of membranes white, basal third of membranes white with a tiny black spot anteriorly between each spine--------------Holocentrus opercularis Valenciennes

2*b*. Dorsal rays X–I, 12; anal IV, 8; scales 42 to 45.

3*a*. Dorsal fin with a large black blotch between the first to fourth spines; anterior edges of soft dorsal and soft anal blackish; upper and lower edges of caudal blackish; body with about 10 horizontal rows of blackish close set spots, cheek with five or six rows of black spots; gill rakers 7 or 8+1+10 or 11------ Holocentrus sammara (Forskål)

3*b*. Dorsal fin plain, no black blotch anteriorly; anterior edges of soft dorsal and soft anal without or with only a trace of blackish pigment; upper and lower edges of caudal fin blackish; 10 or 11 horizontal rows of blackish spots on body, cheek with about five or six rows of black spots; gill rakers 6 or 7+8 to 10.
Holocentrus laevis Günther

1*b*. Dorsal rays XI, 13 to 16; anal IV, 9 or 10.

4*a*. Scale rows on side of body from upper edge of gill opening to base of caudal fin rays fewer than 40.

5*a*. Body with longitudinal stripes; anterior margins of soft dorsal, soft anal and soft pelvic blackish; upper and lower margins of caudal fin blackish; distal portion of membranes between dorsal spines blackish, also blackish along very base of this fin; dorsal rays XI, 13; anal IV, 9; scales 36 to 38; gill rakers 6 or 7+1+12 or 13.
Holocentrus ruber (Forskål)

5*b*. Body without stripes; scales posteriorly brownish, anteriorly with a silvery crescent; upper posterior margin of opercle blackish; margins of fins all pale; dorsal rays XI, 13 or 14; anal IV, 9 or 10; scales 37 to 39; gill rakers 7 or 8+1+ 10 to 13.
Holocentrus violaceus Bleeker

4*b*. Scale rows on side of body numbering more than 41.

6*a*. Scale rows on side of body 42 to 49.

7*a*. Scale rows on side of body about 43 to 45; fourth dorsal spine longer than maxillaries, maxillaries contained in this spine 1 1/10 to 1¼ times; maxillaries about 2⅔ in head; color of spinous dorsal mostly pale with only traces of pigment.

8*a*. Dorsal surface of caudal peduncle without silvery area just posterior to base of soft dorsal; dorsal rays XI, 13; anal IV, 9; gill rakers 8+1+13-- Holocentrus binotatus Quoy and Gaimard

8*b*. Dorsal surface of caudal peduncle silvery just behind base of soft dorsal fin; dorsal rays XI, 14; anal IV, 9; gill rakers about 7+1+11--------------- Holocentrus caudimaculatus Rüppell

7*b*. Scales about 46 to 49.

9*a*. Dorsal rays XI, 15 or 16; anal IV, 10; gill rakers about 7+1+11 or 12; on dorsal side of caudal peduncle just posterior to base of soft dorsal with a grayish to silvery spot, usually dark in small specimens and silvery in large ones; upper axil of pectoral grayish; spinous dorsal fin plain pale in color; third anal spine much shorter than from front of eye to rear of head.
Holocentrus spinifer (Forskål)

9*b*. Dorsal rays XI, 13 (rarely 14); anal IV, 9; gill rakers 5 to 7+1+10 to 12; spinous dorsal fin with small grayish or brownish blotches in a row about ⅔ the way out from base of fin; body profusely speckled with brown or blackish pigment cells; third anal spine equal to distance from front of eye to rear of head.
Holocentrus lacteo-guttatus Cuvier

6*b*. Scale rows 50 to 53.

10*a*. Maxillary much longer than eye, the latter contained in it about 1⅓ to 1½ times; length of 4th dorsal spine is contained 1¼ to 1⅓ times in the distance from tip of snout to rear of maxillary; maxillary about 2$\frac{1}{10}$ times in head; no blackish or silvery spot posteriorly on caudal peduncle behind base of soft dorsal fin; dorsal rays XI, 14 or 15; anal IV, 9 or 10; gill rakers 7 to 9+1+12 to 14.
Holocentrus erythraeus Günther

10*b*. Maxillary about same length as diameter of eye; length of fourth dorsal spine is contained ⅗ to ⅘ time in the distance from tip of snout to rear of maxillary.

11*a*. Dorsal fin mostly blackish, the middle of fin with a white line; membrane of anal fin between third and fourth spine and fourth spine and first soft ray blackish; axil of pectoral blackish; dorsal rays XI, 13 or 14; anal IV, 9; scales about 51; gill rakers 6+1+12 or 13___Holocentrus diadema Lacepède

11*b*. Dorsal fin mostly pale, a blackish blotch distally between first to third dorsal spine then a weak brownish or grayish blotch distally between each spine; no blackish pigment on anal fin; axil of pectoral mostly pale; dorsal rays XI, 13 or 14; anal IV, 9; scales 51 to 53; gill rakers 6 or 7+1+13.
Holocentrus microstomus Günther

HOLOCENTRUS OPERCULARIS Valenciennes

Holocentrum operculare Valenciennes, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 7, p. 501, 1831.

115270, Rose Island, lagoon, June 12 to 20, 1939, 1 specimen.
52198, Pago Pago, Samoa, Jordan and Kellogg, 1 specimen.
82943, Samoa, Wilkes Exploring Expedition, 1 specimen.

HOLOCENTRUS SAMMARA (Forskål)

Sciaena sammara Forskål, Descriptiones animalium, pp. 13, 48, 1775.

115240, Hull Island, reef, July 12–15, 1939, 1 specimen.
115238, Rose Island, lagoon, June 12 to 20, 1939, 4 specimens.
115239, Canton Island, lagoon, May 23–26, 1939, 5 specimens.
115237, Hull Island, channel, July 8–12, 1939, 8 specimens.
115236, Rose Island, reef, June 11–14, 1939, 2 specimens.
52400, Apia, Samoa, 9 specimens.
34807, Apia, Samoa, May 15, 1883, W. H. Jones, 1 specimen.

HOLOCENTRUS LAEVIS Günther

Holocentrum laeve Günther, Catalogue of the fishes of the British Museum, vol. 1, p. 47, 1859.

115271, Canton Island, lagoon, May 23–26, 1939, 6 specimens.
52197, Apia, Samoa, Jordan and Kellogg, 3 specimens.

HOLOCENTRUS RUBER (Forskål)

Sciaena rubra Forskål, Descriptiones animalium, pp. 11, 48, 1775.

115269, Tutuila Island, reef at Alofau, June 3, 1939, 2 specimens.

HOLOCENTRUS VIOLACEUS Bleeker

Holocentrum violaceum Bleeker, Nat. Tijdschr. Ned. Ind., vol. 5, p. 335, 1853.

115272, Canton Island, lagoon, May 23–25, 1939, 1 specimen.
52385, Pago Pago, Samoa, Jordan and Kellogg, 8 specimens.

HOLOCENTRUS BINOTATUS Quoy and Gaimard

Holocentrum binotatum Quoy and Gaimard, Voyage de découvertes de *L'Astrolabe* . . ., vol. 3, p. 679, pl. 14, fig. 4, 1834.

116751, Pago Pago, Samoa, Jordan and Kellogg, 1 specimen.

HOLOCENTRUS CAUDIMACULATUS Rüppell

Holocentrus caudimaculatus Rüppell, Neue Wirbelthiere, Fische, p. (97) 103, 1835.

52414, Apia, Samoa, Jordan and Kellogg, 6 specimens.

HOLOCENTRUS SPINIFER (Forskål)

Sciaena spinifera Forskål, Descriptiones animalium, pp. 12, 49, 1775.

115266, Tutuila Island, reef at entrance Pago Pago Bay, June 12, 1939, 7 specimens.
115267, Tutuila Island, reef at Alofau, June 3, 1939, 16 specimens.
115265, Rose Island, reef, June 11–14, 1939, 2 specimens.
115268, Canton Island, lagoon, May 23–25, 1939, 3 specimens.

HOLOCENTRUS LACTEO-GUTTATUS Cuvier

Holocentrus lacteo-guttatum Cuvier, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 3, p. 214, 1829.

115235, Enderbury Island, reef, May 15–19, 1939, 35 specimens.
115230, Tutuila Island, reef at Alofau, June 3, 1939, 5 specimens.
115231, Canton Island, lagoon, May 23–25, 1939, 2 specimens.
115233, Tutuila Island, Fagasa Bay, rock pools, June 5, 1939, 6 specimens.
115234, Swains Island, reef, May 3–9, 1939, 29 specimens.
115232, Rose Island, reef, June 11–14, 1939, 24 specimens.
115229, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 2 specimens.
115226, Tau Island, reef at Siulagi Point, June 27, 1939, 5 specimens.
115228, Hull Island, channel, July 7–17, 1939, 2 specimens.
115224, Hull Island, reef, July 12–15, 1939, 4 specimens.
115225, Rose Island, lagoon, June 12–20, 1939, 1 specimen.
115227, Hull Island, reef, July 13, 1939, 1 specimen.
52199, Apia, Samoa, Jordan and Kellogg, 4 specimens.

Color in life, from notes on a specimen taken from reef at entrance to Pago Pago Bay: Upper half of body red; fins lighter red or dark pinkish; pectoral fin tinged with pink; margin of anal spine white; cheek and center of opercle whitish as in lower half of body in front of anal fin; eye yellowish, blackish dorsally; membranes between spines of dorsal at margin with bright-red spots.

HOLOCENTRUS ERYTHRAEUS Günther

Holocentrum erythraeum GÜNTHER, Catalogue of the fishes of the British Museum, vol. 1, p. 32, 1859.

115258, Hull Island, reef, July 13, 1939, 1 specimen.
52413, Apia, Samoa, Jordan and Kellogg, 1 specimen.
52411, Apia, Samoa, Jordan and Kellogg, 2 specimens.
52277, Pago Pago, Samoa, Jordan and Kellogg, 2 specimens.

HOLOCENTRUS DIADEMA Lacepède

Holocentrus diadema LACEPÈDE, Histoire naturelle des poissons, vol. 4, pp. 335, 372, 1802, pl. 32, fig. 3, in vol. 3, 1802 ("Manuscrits chinois").

115259, Tutuila Island reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 5 specimens.
15109, Samoa, A. B. Steinberger, 2 specimens.
56992, Samoa, 27 specimens.
82951, Samoa, Wilkes Exploring Expedition, 1 specimen.
52391, Apia, Samoa, Jordan and Kellogg, 12 specimens.

HOLOCENTRUS MICROSTOMUS Günther

Holocentrum microstoma GÜNTHER, Catalogue of the Fishes of the British Museum, vol. 1, p. 34, 1859.

115252, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 3 specimens.
115250, Tutuila Island. reef at Alofau, June 3, 1939, 8 specimens.
115254, Rose Island, lagoon, June 12 to 20, 1939, 2 specimens.
115256, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 12 specimens.
115253, Canton Island. lagoon, April 23 to May 12, 1939, 3 specimens.
115251, Hull Island, channel, July 7–17, 1939, 3 specimens.
115255, Canton Island, lagoon, May 23–25, 1939, 3 specimens.
115257, Rose Island, reef, June 11–14, 1939, 29 specimens.
115249, Hull Island, reef, July 12–15, 1939, 1 specimen.
52374, Pago Pago, Jordan and Kellogg, 4 specimens.

Color in life from notes taken on a specimen from the reef at the entrance of Pago Pago Bay: Eye reddish; body above dark reddish with lateral horizontal streaks of red, then red-blackish, then lighter red, then red-blackish, the whitish streaks becoming more prominent ventrally and the last red-blackish streak occurring along upper edge of lateral line; those below alternating red and white; belly white; lateral line red; anal spines white, soft rays near them bright red; caudal reddish with orange near tips; soft dorsal pink; membrane between first and second and second and third dorsal spine with black spots, below which are pinkish areas, and above are bright red spots; the membrane at tip of spine posteriorly white; cheeks rusty red; margin of preopercle white; opercle rusty red; lower sides of head whitish; tip of snout and chin whitish.

TABLE 7.—*Counts made on species of the genus* Holocentrus

Species	Dorsal rays								Anal rays				
	Spines			Soft rays					Spines	Soft rays			
	X	XI	I	12	13	14	15	16	IV	8	9	10	11
opercularis	3		3		3				3		3		
lacteo-guttatus		7			6	1			6		6		
spinifer		10					9	1	10			10	
sammara	5		5	5					5	5			
violaceus		4			1	3			4		3	1	
diadema		5			4	1			5		5		
ruber		2			2				2		2		
microstomus		6			5	1			6		6		
laevis (52197)	4		4	4					4	4			
erythraeus (52413)		7			1	3	3		7		6	1	
binotatus (116751)		1			1				1		1		
caudimaculatus		6				6			6		6		

Species	Scale rows from gill opening to base of caudal fin																	
	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
opercularis						2	1											
lacteo-guttatus											2	2	1	1				
spinifer												1	1					
sammara							2	1	1									
violaceus		1	2	1														
diadema																2		
ruber	1		1															
microstomus																1	1	2
laevis (52197)							1		2	1								
erythraeus (52413)															1	5	1	
binotatus (116751)									1									
caudimaculatus								1	1	1								

Species	Gill rakers on first gill arch												
	Above					At angle	Below						
	5	6	7	8	9	1	8	9	10	11	12	13	14
opercularis		2	1			3			1	2			
lacteo-guttatus	2	3	1			6			1	3	2		
spinifer			2			2				1	1		
sammara			3	1		4			2	2			
violaceus			3	1		4			1	1	1	1	
diadema		2				2					1	1	
ruber		1	1			2			2				
microstomus		2	1			3						3	
laevis (52197)		2	1			3	1	1	1				
erythraeus (52413)			2	4	1	7					1	5	1
binotatus (116751)				1		1						1	
caudimaculatus			2			2				2			

Order THORACOSTEI

Family SYNGNATHIDAE

KEY TO THE PIPEFISHES FROM THE PHOENIX AND SAMOAN ISLANDS AS REPRESENTED BY SPECIMENS IN THE NATIONAL MUSEUM[5]

1*a*. Caudal fin absent, tail prehensile; pectoral present; egg pouch of male in front of anal fin; body depressed with narrow dorsal surface and the ventral surface much broadened; dorsal 40; rings 17+50; pectoral 22; anal 5; postorbital length of head twice in snout; eye 4 in snout.
Syngnathoides biaculeatus (Bloch)

1*b*. Caudal fin present, tail not prehensile; anal fin present.

2*a*. Superior cristae of trunk and of tail discontinuous; operculum with a keel either confined to base of operculum or extending along its entire length; base of dorsal fin not elevated.

3*a*. Trunk rings more numerous than tail rings numbering 18+14 to 16; dorsal rays 25 to 28; anal 3 or 4; pectoral 20 or 21; egg pouch in front of anal fin; caudal fin 1½ times in head; length of caudal fin equal to snout and eye; median cristae of trunk continuous with inferior cristae of tail; inferior cristae of trunk ending on last trunk ring; superior cristae of trunk ending on next to last ring along dorsal fin base; color brown; on a specimen 52 mm. in standard length a black band extends from snout through eye, thence along side of body; tail fin blackish posteriorly, the basal ¼ white, margin of fin white, and a white area or spot in center of caudal fin posteriorly; middorsal line of snout with four or five small blunt spines then a space and four or five more; anterior half of interorbital space with a double ridge, the edges serrated
Doryrhamphus melanopleura (Bleeker)

3*b*. Trunk rings about equal to or much fewer in number than tail rings.

4*a*. Trunk rings about 21+22 to 24; dorsal rays 39 or 40; anal 3; pectoral 21; anus closer to base of caudal fin than pectoral fin base; most of dorsal fin on tail rings; median cristae of trunk continuous with inferior cristae of tail, inferior cristae of trunk subcontinuous almost continuous with inferior cristae of tail; postorbital part of head 2½ times in snout; eye 4½ to 5 in snout; ridges on head not serrated, but keels of rings rough; egg pouch of male abdominal
Doryichthys brachyurus (Bleeker)

4*b*. Trunk rings numbering about or at least half as numerous as tail rings, 15 or 16+30 to 40.

5*a*. Tail rings with median cristae; egg pouch in front of anal fin; anus much closer to base of pectoral than base of caudal fin, the distance from base of pectoral to anus 1⅔ in tail; dorsal mostly on tail rings; rings 16+31 or 32; dorsal rays about 33; pectoral 17 or 18; anal 3; postorbital part of head about equal to snout; eye twice in snout; ridges of head smooth; median cristae of trunk continuous with inferior cristae of tail; caudal fin equal to postorbital part of head________ Doryichthys retzii (Bleeker)

5*b*. Tail rings without median cristae; egg pouch of male behind anal fin; dorsal fin mostly on tail rings.

6*a*. Snout shorter than postorbital part of head and with a middorsal serrated keel; keel on opercle confined to its base; supraorbital cirri present; median cristae of trunk continuous with inferior cristae of tail; dorsal rays about 21 or 22; pectoral 14; rings 15+35; anus to pectoral base more than twice in tail; snout 1½ in postorbital length of head; eye equal to snout. Micrognathus mataafae (Jordan and Seale)

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[5] Modified after Weber and De Beaufort, 1922.

6*b*. Snout longer than postorbital part of head and without a middorsal serrated keel; dorsal rays 28 to 39; rings about 16+35 or 36; inferior cristae of trunk continuous with inferior cristae of tail; middorsal region of nape with three keeled plates.

7*a*. Dorsal rays 27 to 29; rings 16+35; pectoral 16 or 17; anal 3 or 4; postorbital part of head above lower level of eye with about eight lengthwise brown lines, more or less reticulated; a brown streak across ventral margin of eye from snout to lower part of opercle; reticulated lines form about 13 brownish bars, two or three times wider than pale interspaces anteriorly; postorbital part of head contained 1⅕ times in snout; eye about 1.9 times in snout. Corythoichthys fasciatus (Gray)

7*b*. Dorsal rays 32 to 35; rings 16+36 to 39; pectoral 14 or 15; anal 3 or 4; postorbital part of head with a brown streak from snout across lower level of eye; above this a pale streak then another brown streak on level of pupil across opercle; two or three irregular reticulated lines on top of head; sides of body with about 25 vertically arranged patches of reticulated lines narrower than the pale interspaces; anus of males black, that of female pale; postorbital part of head contained 1⅕ in snout; eye 1.8 in snout. Corythoichthys conspicillatus (Jenyns)

2*b*. Superior cristae of trunk and of tail continuous; operculum with a keel; base of dorsal not elevated.

8*a*. Median cristae of trunk continuous with inferior cristae of tail; above median cristae of trunk is a row of cristae continuous as median cristae on tail; below median cristae of trunk is a row of cristae only on trunk; inferior cristae of trunk end on ring containing anal fin; egg pouch of male in front of anal fin; color either pale spotted or dark spotted, sometimes about five or six pale saddles on back, three in front of dorsal and two or three behind it; dorsal rays about 30 or 31; pectoral about 21; rings 19+23 to 25. Choeroichthys sculptus (Günther)

8*b*. Inferior cristae of trunk continuous with inferior cristae of tail; median cristae of trunk ends on last trunk ring, no other median cristae; a serrated median dorsal keel on snout; a bony ridge around orbit dorsally with a blunt spine above eye; two middorsal keeled plates behind eye, the first above base of keel on operculum the second at nape; cirri on ridge above opercle and in front of gill opening; all rings with strong cristae but not with spines; body square in cross section, the sides all concave; color brown with about six pale indistinct narrow bars or wide lines; a few brown spots on sides; predorsal region is pale; base of caudal fin pale, blackish distally; caudal has a white marginal band; last three caudal rings white; postorbital part of head a trifle shorter than snout; eye 2½ in snout; anus a trifle closer to tip of snout than base of caudal fin; dorsal rays 21; pectoral 14; anal 4, rings 15+27_____ Ichthyocampus diacanthus, new species

Genus SYNGNATHOIDES Bleeker

Syngnathoides BLEEKER, Nat. Tijdschr. Ned. Ind., vol. 2, pp. 231, 259, 1851. (Type, *S. blochi* Bleeker.)

SYNGNATHOIDES BIACULEATUS (Bloch)

Syngnathus biaculeatus BLOCH, Naturgeschichte der aüslandischen Fische, vol. 1, p. 10, pl. 121, figs. 1–2, 1785.

52216, Apia, Samoa, Jordan and Kellogg, 1 specimen.

Genus DORYRHAMPHUS Kaup

Doryrhamphus KAUP, Archiv Naturg., vol. 19, pt. 1, p. 233, 1853; Catalogue of the lophobranchiate fish in the collection of the British Museum, p. 54, 1856. (Type, *Doryrhamphus excisus* Kaup, monotypic.)

DORYRHAMPHUS MELANOPLEURA (Bleeker)

Syngnathus melanopleura BLEEKER, Nat. Tijdschr. Ned. Ind., vol. 15, p. 464, 1858.

116089, Tau Island, reef at Siulagi Point, June 27, 1939, 3 specimens.
116090, Tutuila Island, reef at Alofau, June 3, 1939, 1 specimen, 52 mm.
84164, Tutuila Island, Samoa, January 3, 1921, Lt. R. C. Reed, 1 specimen.

Genus DORYICHTHYS Kaup

Doryichthys KAUP, Archiv Naturg., vol. 19, pt. 1, p. 233, 1853; Catalogue of the lophobranchiate fish in the collection of the British Museum, p. 56, 1856.—JORDAN and EVERMANN, U. S. Nat. Mus. Bull. 47, p. 773, 1896; and JORDAN, Genera of fishes, pt. 2, p. 254, 1919 (both designated the "logotype" as "*D. bilineatus* Heckel," first species listed by Kaup).

Doryichthys DUNCKER, Spolia Zeylanica, vol. 7, pt. 25, p. 27, 1910; Mitth. Nat. Mus. Hamburg, vol. 29, p. 229, 1912 (genotype, *Doryichthys cunculus* Hamilton); vol. 32, p. 49, 1915.—WEBER and DE BEAUFORT, The fishes of the Indo-Australian Archipelago, vol. 4, p. 49, 1922.

Microphis KAUP, Archiv Naturg., vol. 19, pt. 1, p. 234, 1853; Catalogue of the lophobranchiate fish in the collection of the British Museum, p. 63, 1856.—JORDAN and EVERMANN U. S. Nat. Mus. Bull. 47, p. 773, 1896 (designates *Microphis cuncatus*, a misprint for *cuncalus* Hamilton).—JORDAN. Genera of Fishes, pt. 2, p. 254, 1919 (designates "*Syngnathus deokhata* Ham.," a misspelling of *S. deocata* Hamilton, first species listed by Kaup).

Microphis DUNCKER, Spolia Zeylandica, vol. 7, pt. 25, p. 26, 1910 (type, *Microphis brachyurus* (Bleeker), monotypic); Mitth. Nat. Mus. Hamburg, vol. 32, p. 43, 1915.—WEBER and DE BEAUFORT, The fishes of the Indo-Australian Archipelago, vol. 4, p. 43, 1922.

Doryrhamphinarum KAUP, Catalogue of the lophobranchiate fish in the collection of the British Museum, p. 62, 1856 (type, *Syngnathus heterosoma* Bleeker, monotypic)

Oostethus HUBBS, Occ. Pap. Univ. Michigan Mus. Zool., No. 199, p. 3, 1929 (type, *Doryichthys lineatus* Kaup, 1856).

DORYICHTHYS BRACHYURUS (Bleeker)

Syngnathus brachyurus BLEEKER, Verh. Batav. Genoot. (Trosk.), vol. 25, p. 16, 1853.

52223, Apia, Samoa, Jordan and Kellogg, 6 specimens.

DORYICHTHYS RETZII (Bleeker)

Syngnathus retzii Bleeker, Acta Soc. Sci. Ind. Neerl. (Manado), vol. 1, p. 79, 1856.

51725 (type of *Microphis torrentius* Jordan and Seale), Vaivase River, Apia, Samoa, Jordan and Kellogg.

61171 (2 paratypes of *Microphis torrentius* Jordan and Seale), Vaivase River, Apia, Samoa.

52263, Apia, Samoa, Jordan and Kellogg, 2 specimens.

118390, Apia, Samoa, Jordan and Kellogg, 1 specimen.

Genus MICROGNATHUS Duncker

Micrognathus Duncker, Mitth. Nat. Hist. Mus. Hamburg, vol. 29, p. 228, 1912. (Type, *Syngnathus brevirostris* Rüppell.)

MICROGNATHUS MATAAFAE (Jordan and Seale)

Corythroichthys mataafae Jordan and Seale, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 213, fig. 19, 1906.

116092, Tutuila Island, reef at Alofau, June 3, 1939, 2 specimens.

51724 (type of *Corythroichthys mataafae*), Mulinu, Upolu Island, Jordan and Kellogg.

Genus CORYTHOICHTHYS Kaup

Corythoichthys Kaup, Archiv Naturg., vol. 19, pt. 1, p. 231, 1853. (Type, *C. albirostris* Heckel, designated by Jordan, Genera of fishes, pt. 2, p. 253, 1919, and by Jordan and Evermann, U. S. Nat. Mus. Bull. 47, p. 761, 1896.)

CORYTHOICHTHYS FASCIATUS (Gray)

Syngnathus fasciatus Gray, Illustrations of Indian zoology . . ., vol. 1, pl. 89, figs. 2, 2–a, 1830–1832.

51723 (type and paratype of *Corythroichthys waitei* Jordan and Seale), Apia, Samoa, Jordan and Kellogg.

82942, Samoa, Wilkes Exploring Expedition, 7 specimens.

CORYTHOICHTHYS CONSPICILLATUS (Jenyns)

Syngathus conspicillatus Jenyns, The zoology of the voyage of H. M. S. *Beagle*, Fish, p. 147, pl. 27, fig. 4, 1842.

116093, Canton Island, lagoon, May 23–25, 1939, 1 specimen.

51722 (type and paratype of *Corythroichthys sealei* Jordan and Starks), Apia, Samoa, Jordan and Kellogg.

Genus CHOEROICHTHYS Kaup

Choeroichthys Kaup, Archiv Naturg., vol. 19, pt. 1, p. 233, 1853 (*nomen nudum*); Catalogue of the lophobranchiate fish in the collection of the British Museum, p. 55, 1856. (Type, *Ch. valencienni* Kaup, monotypic.)

CHOEROICHTHYS SCULPTUS (Günther)

Doryichthys sculptus Günther, Catalogue of the fishes of the British Museum, vol. 8, p. 185, 1870.

116096, Enderbury Island, reef, May 15–19, 1939, 17 specimens.

116095, Tau Island, reef at Siulagi Point, June 27, 1939, 31 specimens.

116094, Tutuila Island, reef at Alofau, June 3, 1939, 2 specimens.
116097, Canton Island, reef at ocean, April 25–28, 1939, 4 specimens.
116098, Swains Island, reef, May 3–9, 1939, 3 specimens.

Genus ICHTHYOCAMPUS Kaup

Ichthyocampus Kaup, Archiv Naturg., vol. 19, pt. 1, p. 231, 1853; Catalogue of the lophobranchiate fish in the collection of the British Museum, p. 29, 1856. (Type, designated as *I. belcheri* Kaup by Jordan, Genera of fishes, pt. 2, p. 253, 1919.)

ICHTHYOCAMPUS DIACANTHUS, new species

Plate 8

Holotype.—A specimen (probably female) (U. S. N. M. No. 116091), without brood pouch, 67.7 mm. in standard length, taken by Leonard P. Schultz on the reef of Tutuila Island at Alofau, June 3, 1939.

Description.—(Based on the holotype, only known specimen.) The following measurements of various characters have been converted into hundredths of the standard length (67.7 mm.): Tip of snout to front of gill opening 12.6; tip of snout to rear of bony opercle 13.1; tip of snout to front of orbit 5.9; diameter of eye 2.2; postorbital part of head (front of gill opening) 4.6; rear of orbit to rear of bony opercle 5.1; length of maxillaries 1.8; least width of bony interorbital space 1.3; length of base of dorsal fin 10.2; length of longest dorsal fin ray 2.9; length of longest caudal fin ray 1.8; length of longest pectoral fin ray 2.9; width of snout at one-half its length 1.8; greatest depth of body 5.9; depth of body at anus 5.2; width of body at anus 4.8; distance from tip of snout to anus 46.3; anus to base of caudal fin 53.7; snout to origin of dorsal fin 41.4.

The following counts were made: Dorsal rays 21+½; anal 4; pectoral 14–14; rings 15 (trunk) +27 (caudal); dorsal fin on 2 trunk+3 caudal rings; 13 trunk rings before dorsal.

The middorsal line of snout has a serrated keel; at middle of upper side of snout is a single small spiny projection; a strong supraorbital ridge with a small spiny projection is prominent with a keel extending a short distance behind orbit; behind eyes and in front of the nape occurs a middorsal keeled plate or spiny ridge, and behind this is a less prominent keeled plate on nape; a weak keel occurs on head just above the opercle, on which is a small dermal flap; there are two small keels just in front of base of pectoral fin; a small sharp keel on base of opercle, with a dermal flap; there is a series of tiny cirri around the eye; other small cirri posteriorly near margin of opercle; the interorbital space is deeply concave; each abdominal or trunk ring has median cristae; the midventral line of the trunk rings are weakly keeled, the surface is convex; the angles or cristae of each ring are slightly rough, and become strong posteriorly and anteriorly, there are no spiny projections but the posterior end of each cristae on the tail becomes increasingly sharp pointed posteriorly.

Color brown, darker behind dorsal fin and pale dorsally in front of dorsal fin; a black spot around base of first dorsal ray and another at base of last dorsal ray; in front of base of caudal fin the last three tail rings are white, the basal two-thirds of the caudal fin blackish but the margin white; in front of the dorsal there are two narrow pale bars, another at middle of dorsal fin, and four behind it; there is a series of dark dots along the upper edges of the inferior trunk cristae; a few irregularly placed dark spots between the median and dorsal cristae on the trunk; a black spot at upper edge of pectoral fin base.

Remarks.—This new species of *Ichthyocampus* differs from all other species in the genus with the superior and inferior cristae of trunk continuous with the same cristae on the tail in having but 21 dorsal rays and only 15+27 rings except *I. kampeni* Weber and *I. belcheri* Kaup; all the other species reported have more than 22 dorsal rays and more than 16+30 rings. From *I. kampeni* Weber the new species differs in coloration; there are but four pale bars behind the dorsal in *diacanthus* instead of seven, and the last three tail rings are white instead of blackish as in *kampeni; diacanthus* has cutaneous appendages on the head and *kampeni* none; supraorbital ridges of *diacanthus* strong and spinelike, almost absent on *kampeni.*

I. diacanthus differs from *I. belcheri* Kaup in having the dorsal origin on the fourteenth trunk ring instead of on the "second caudal ring,"[6] and Kaup[7] says that the "dorsal fin stands on 5 rings, the anal ring being the first of them"; the operculum of *belcheri* is without a keel, while *diacanthus* has a strong keel basally; no dermal cirri or cutaneous flaps are mentioned as occurring on *belcheri*, while several occur on the new species.

Named *diacanthus* in reference to the two spiny projections, one over each orbit, bearing a short dermal flap.

Order AULOSTOMI

Family AULOSTOMIDAE

Genus AULOSTOMUS Lacepède

Aulostomus LACEPÈDE, Histoire naturelle des poissons, vol. 3, p. 356, 1803 [Type, *Aulostomus chinensis* Lacepède (=*Fistularia chinensis* Linnaeus).]

AULOSTOMUS CHINENSIS (Linnaeus)

Fistularia chinensis LINNAEUS, Systema naturae, ed. 12, p. 515, 1766.

115196, Canton Island, lagoon, May 23–25, 1939, 1 specimen.
52525, Apia, Samoa, Jordan and Kellogg, 1 specimen.

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[6] Günther, Catalogue of the fishes of the British Museum, vol. 8, p. 177, 1870.

[7] Catalogue of the lophobranchiate fish in the collection of the British Museum, p. 30, 1856.

Family FISTULARIIDAE

Genus FISTULARIA Linnaeus

Fistularia Linnaeus, Systema naturae, ed. 10, p. 312, 1758. (Type, *Fistularia tabacaria* Linnaeus.)

FISTULARIA PETIMBA Lacepède

Fistularia petimba Lacepède, Histoire naturelle des poissons, vol. 5, pp. 349, 350 (pl. 18, fig. 3, in vol. 2), 1803.

115188, Canton Island reef in shallow channel, May 13, 1939, 1 specimen.
115189, Swains Island, reef, May 3–9, 1939, 1 specimen.
115190, Tutuila Island, reef at Alofau, June 3, 1939, 1 specimen.
115193, Rose Atoll, lagoon, June 12, 1939 1 specimen.
115192, Rose Atoll, reef, June 13–14, 1939, 8 specimens.
115191, Canton Island, deep channel, April 24, 1939, 1 specimen.

Order PERCOMORPHI

Family ATHERINIDAE

KEY TO THE SPECIES OF ATHERINIDAE FROM THE PHOENIX AND SAMOAN ISLANDS

1*a*. Posterior upper corner of mandible inside of mouth not turned upward or elevated, toothed edge straight or nearly so; inner upper edge of premaxillary each side of middle premaxillary process without a second lateral posteriorly directed process; premaxillary process a little shorter than pupil; distance from insertion of pelvics to anus about equal to eye and 2½ times in pelvic insertion to origin of anal fin; thus anus is closer to pelvic insertion than to anal origin; anal rays I, 14 or 15; dorsal rays V to VII–I, 9 or 10; gill rakers about 5+1+21; scales 2½+43 or 44+3; pectoral 16; outer dorsal half of pectoral with a black area, the posterior margin of the fin hyaline; tips of upper and lower caudal lobes blackish; tip of chin and side of mandible blackish, the free lips at sides of mandible white; outer edges of premaxillary and maxillary blackish anteriorly; snout blackish; upper edge of eye black; a white band around front of eye; snout 1⅓ in eye; eye 2⅘ in head; snout 2⅕ and eye 1½ times in distance between origin of dorsals.
Hepsetia pinguis (Lacepède)

1*b*. Posterior upper angle of mandible inside of mouth elevated or turned upward, toothed edge not straight; inner upper edge of premaxillary at each side of middle process with a groove, then a lateral spinelike process; middle premaxillary processes long and slender, about two or three times longer than pupil; peritoneum black.

2*a*. Distance from insertion of pelvics to anus about equal to or trifle longer than eye and 2.8 to 3 times in pelvic insertion to origin of anal fin; thus anus is much closer to pelvic insertion than to anal origin; anal rays I, 10; dorsal IV–I, 9 or 10; gill rakers 5 or 6+1+22 or 23; scales 2½+42 or 43+3; pectoral 16; pectoral fin rays without blackish area; caudal fin lobes without blackish tips on specimens up to 55 mm. in standard length, base of rays each side of midaxis with a silvery-black spot, somewhat diffuse; tip of chin and sides of mandible blackish, the lips at sides posteriorly white; tip and front of premaxillary blackish; a black patch near front of maxillary; dorsal side of snout blackish; at base of each pectoral ray with black pigment______________________________________ Atherina ovalaua Herre

2*b*. Distance from insertion of pelvics to anus 1½ to 1¾ times eye and 1.8 to 2.2 times in pelvic insertion to origin of anal fin; thus anus is almost midway between insertion of pelvics and anal origin; anal rays I, 11 or 12; dorsal VI or VII–I, 9; gill rakers 5 or 6+1+21 or 22; scales 2½+46 to 48+3 pectoral 17 or 18; pectoral fin rays without blackish area; caudal fin rays not blackish; base of caudal fin each side of midline with a patch of silvery-black scales; lips at tip and front sides of lower jaw blackish, white posteriorly; side of mandible blackish; front of premaxillary blackish; maxillary white, no black pigment near its front; a crescent-shaped black blotch in front of eye dorsally; inside of opercular apparatus heavily pigmented; dorsal side of snout and upper lateral side of snout blackish; black pigment at base of each pectoral ray____ Atherina uisila Jordan and Seale

Genus HEPSETIA Bonaparte

Hepsetia Bonaparte, Iconografia della fauna italica . . ., fasc. 91 (no pagination), 1836. (Type, *Atherina boyeri* Linnaeus.)

HEPSETIA PINGUIS (Lacepède)

Atherina pinguis Lacepède, Histoire naturelle des poissons, vol. 5, p. 372, pl. 11, 1803.

115109, Tutuila Island, reef of Alofau, June 3, 1939, 2 specimens.

115108, Tutuila Island, Cocoanut Point, June 4, 1939, 4 specimens.

115111, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 1 specimen.

115110, Tutuila Island, Pago Pago Bay, taken in net cast off side of U. S. S. *Bushnell*, June 7, 1939, 8 specimens.

Genus ATHERINA Linnaeus

Atherina Linnaeus, Systema naturae, ed. 10, p. 315, 1758. (Type, *Atherina hepsetus* Linnaeus.)

ATHERINA UISILA Jordan and Seale

Atherina uisila Jordan and Seale, Bull. United States Bur. Fish., vol. 25 (1905), p. 216, fig. 23, 1906.

115113, Rose Island reef, June 11–14, 1939, 20 specimens.

115112, Rose Island lagoon, June 12–20, 1939, 4 specimens.

51726 (1 holotype and 15 paratypes of *A. uisila*), Apia, Samoa, Jordan and Kellogg.

ATHERINA OVALAUA Herre

Atherina ovalaua Herre, Field Mus. Nat. Hist. Publ., zool. ser., vol. 18, p. 401, 1935; vol. 21, p. 90, fig. 5, 1936.

My specimens from Canton and Hull Islands are referred to this species with considerable uncertainty, but until the genus *Atherina* is carefully reviewed it is impossible to distinguish them with any degree of surety. The Canton Island specimens at 55 mm. contained eggs almost ready for spawning.

115183, Canton Island lagoon, May 25–26, 1939, 89 specimens.

115181, Canton Island lagoon coral heads, May 23–25, 1939, 45 specimens.

115182, Hull Island, channel, July 8–12, 1939, 13 specimens.

115184, Hull Island, channel, July 7–17, 1939, 4 specimens.

Family MUGILIDAE

KEY TO THE MUGILIDAE OF THE PHOENIX AND SAMOAN ISLANDS BASED ON SPECIMENS IN THE NATIONAL MUSEUM

1a. Upper and lower lips each with two rows of teeth, their tips trifid, these flexible teeth on edge of lips, those on upper lip directed downward, those on lower lip curved outward and upward; cleft of mouth oblique; no adipose eyelids; maxillary not visible when mouth is closed; lower jaw acute; no emargination in ventral edge of preorbital, the posterior edge denticulate; snout longer than eye, pointed; origin of first dorsal a little closer to base of caudal than tip of snout; length of pectoral 1¼ in head; origin of second dorsal over middle of anal; axillary scale not over ⅕ of pectoral; least depth of caudal peduncle 1⅔ in its length and 2⅕ to 2⅓ in head; snout 2⅞ to 3 in head, and 1⅓ in least depth of caudal peduncle; dorsal rays IV–I, 10 or 11; anal III, 10; scale rows on side of body 43 to 46; pectoral rays about 15; gill rakers approximately 38+46.

Neomyxus chaptalii (Eydoux and Souleyet)

1b. Lips not as in *1a*; cleft of mouth not oblique but nearly horizontal.

2a. Adipose eyelid present, covering at least one-half of iris posteriorly; both lips smooth; angle between margins of lower jaw 110° to 115°; posterior end of maxillary visible when mouth is closed; ventral margin of preorbital emarginate and weakly denticulate, its posterior margin denticulate; snout a trifle shorter than diameter of eye; origin of first dorsal equal distance between front of eye and base of caudal fin rays; length of pectoral about 1⅒ in head; origin of second dorsal over middle of anal; axillary scale about ⅓ of pectoral; least depth of caudal peduncle 1½ in its length and 2½ in the head; snout four in head and 1¾ in least depth of caudal peduncle; dorsal rays IV–I, 8; anal III, 9; pectoral about 15; scale rows side of body 33 to 35; gill rakers approximately 31+55.

Mugil engeli Bleeker

2b. Adipose eyelid lacking.

3a. Number of scale rows crossing body from upper edge of gill opening to base of caudal fin rays 26; upper half of pectoral fin black, lower half yellow in life as are the other fins; angle between margins of lips lower jaw about 120°; posterior tip of maxillary visible when mouth is closed; a row of very minute teeth along edge of upper lip; both lips smooth; ventral margin of preorbital notched or deeply emarginate, denticulate; posterior margin rounded and denticulate; snout as long as or a trifle longer than diameter of eye; origin of first dorsal an equal distance between the rear ⅓ of eye and base of caudal fin rays; length of pectoral 1⅓ in head; origin of second dorsal over and about ⅔ way along the anal; axillary scale rudimentary or absent; least depth of caudal peduncle 1½ in its length and 2¼ in the head; snout 3⅔ in head and 1¾ in least depth of caudal peduncle; dorsal rays IV–I, 8; anal III, 8; pectoral about 14; gill rakers about 20 to 32+38 to 58.

Mugil vaigiensis Quoy and Gaimard

3b. Scale rows from 30 to 40 across side of body; pectoral nearly plain in color, not blackish dorsally; angle between margins of pointed lower jaw about 120°.

4a. Scale rows 32 to 33; posterior tip of maxillary visible when mouth is closed; a row of very minute teeth along edge of upper lip; both lips smooth; ventral margin of preorbital emarginate, denticulate; posterior margin rounded, denticulate; no black spot at upper base of pectoral fin; snout 1¼ longer than diameter of eye; origin of first dorsal about equal distance between rear of pupil and base of caudal fin rays; length of pectoral fin about 1⅓ in head; origin of second dorsal over and about ⅔ the way back along anal fin; least depth of caudal peduncle 1⅓ in its length and 1⅞ in the head; snout 3⅓ in head and 1¾ in least depth of caudal peduncle; dorsal rays IV–I, 8; anal III, 9________________ **Mugil troscheli Bleeker**

4*b*. Scale rows 38 to 40; posterior tip of maxillary not visible when mouth is closed; upper base of pectoral with a black spot.

5*a*. Upper lip without or with only a trace of papillae along lower edge; lower lip smooth; margin of preorbital emarginate, denticulate, posterior margin nearly straight denticulate; snout 1⅓ longer than eye; origin of first dorsal about width of pupil closer to tip of snout than midbase of caudal fin; length of pectoral fin 1⅛ in head; origin of second dorsal approximately over end of first ⅕ of anal fin base; least depth of caudal peduncle 1⅗ in its length and 2⅕ in head; snout 3½ in head and 1¾ in least depth of caudal peduncle; dorsal rays IV–I, 8, anal rays III, 9.
Mugil seheli Forskål

5*b*. Upper lip with several rows of fleshy papillae; lower lip crenulated; preorbital deeply emarginate or notched and denticulate, posterior margin denticulate, rounded; snout 1⅓ longer than eye; origin of first dorsal about midway between tip of snout and base of the caudal fin; length of pectoral fin 1⅒ in head; origin of second dorsal over end of first ⅓ distance along base of anal fin; least depth of caudal peduncle 1½ in its length and 2⅛ in the head; snout 3⅓ in head and 1¾ in least depth of caudal peduncle; dorsal rays IV–I, 8; anal III, 9; gill rakers about 50+58________________________________**Mugil crenilabis Forskål**

Genus NEOMYXUS Steindachner

Neomyxus STEINDACHNER, Sitzb. Akad. Wiss. Wien, math.-nat. Cl., vol. 78, p. 384, 1878. (Type, *Myxus sclateri* Steindachner.)

NEOMYXUS CHAPTALII (Eydoux and Souleyet)

Mugil chaptalii EYDOUX and SOULEYET, Voyage autour du monde . . . *Bonite*, Zool., vol 1, p. 171, pl. 4, fig. 1, 1841.

115631, Swains Island, reef, by seine at night, May 4, 1939, L. P. Schultz and Arthur Petit, 65 specimens.

115632, Hull Island, reef, July 12–15, 1939, 4 specimens.

115628, Swains Island, reef, May 3–9, 1939, 9 specimens.

115629, Enderbury Island, reef, May 15–19, 1939, 2 specimens.

115627, Tau Island, reef, at Siulagi Pt., June 27, 1939, 2 specimens.

I believe that *Myxus leuciscus* Günther is this species and should be placed in the synonymy of it.

Genus MUGIL Linnaeus

Mugil LINNAEUS, Systema naturae, ed. 10, p. 316, 1758. (Type, *Mugil cephalus* Linnaeus.)

MUGIL ENGELI Bleeker

Mugil engeli Bleeker, Nat. Tijdschr. Ned. Ind., vol. 15, p. 385, 1858; vol. 16, p. 277, 1858–59.

115645, Tutuila Island, reef at Alofau, June 3, 1939, 26 specimens.

115644, Swains Island, by seining at night on reef, L. P. Schultz and Arthur Petit, 1 specimen.

117765, Apia, Samoa, Jordan and Kellogg, 3 specimens.

MUGIL VAIGIENSIS Quoy and Gaimard

Mugil vaigiensis Quoy and Gaimard, Voyage autour du monde . . . *Uranie*, Zool., p. 337, pl. 59, fig. 2, 1825.

115637, Canton Island, lagoon, April 23 to May 12, 1939, 17 specimens.

115633, Swains Island, by seining on reef at night, May 4, 1939, L. P. Schultz and Arthur Petit, 3 specimens.

115638, Hull Island, channel, July 7–17, 1939, 2 specimens.

115635, Tutuila Island, reef at Alofau, June 3, 1939, 2 specimens.

115636, Canton Island, channel and lagoon, April 24, 1939, 2 specimens.

115634, Canton Island, reef of widest shallow channel, May 13, 1939, 1 specimen.

52441, Apia, Samoa, Jordan and Kellogg, 4 specimens.

MUGIL TROSCHELI Bleeker

Mugil troscheli Bleeker, Nat. Tijdschr. Ned. Ind., vol. 16, p. 277, 1858–59.

115643 Tutuila Island, Cocoanut Point, June 4, 1939, 5 specimens.

52529 Apia, Samoa, Jordan and Kellogg, 11 specimens.

52438 Pago Pago, Samoa, Jordan and Kellogg, 4 specimens.

38290 Pago Pago, Samoa, Dr. W. H. Jones, 7 specimens.

15111 (type of *Agonostomus dorsalis* Streets), Samoan Islands, A. B. Steinberger.

Streets' type of *Agonostomus dorsalis* has 33 scale rows and cannot possibly be the same as *Mugil seheli* Forskål with 38 to 40 scales; it must therefore be removed from the synonymy of that species in Fowler's "Fishes of Oceania," 1928.

MUGIL SEHELI Forskål

Mugil crenilabis seheli Forskål, Descriptiones animalium . . . . pp. 14, 73, 1775.

52436, Apia, Samoa, Jordan and Kellogg, 6 specimens.

MUGIL CRENILABIS Forskål

Mugil crenilabis Forskål, Descriptiones animalium . . . . pp. 14, 73, 1775.

115641, Canton Island, lagoon, April 23 to May 12, 1939, 10 specimens.

115642, Canton Island, lagoon, May 25–26, 1939, 1 specimen.

115640, Hull Island, channel, July 8–12, 1939, 1 specimen.

115639, Tutuila Island, reef at Alofau, June 3, 1939, 2 specimens.

Family SPHYRAENIDAE

KEY TO THE SPECIES OF SPHYRAENA IN THE NATIONAL MUSEUM FROM THE PHOENIX AND SAMOAN ISLANDS[8]

1*a*. Scale rows about 80 from upper angle of gill opening to base of pelvic fins; distance from insertion of pectoral fin to pelvic fin less than postorbital part of head.

2*a*. Maxillary extending to below front of eye; posterior margin of preoperculum rounded, lower angle not produced; groove behind maxillaries covered by a membranous flap that extends upward; distance between insertions of pectoral and pelvics 1.1 to 1.3 times in postorbital part of head, 2.7 to 3 times in distance between dorsals and 1.3 to 1.5 in snout; head 3¼ in standard length; preorbital 1.9 in eye; postorbital part of head 1.1 in snout; fleshy interorbital 2 in maxillaries and 1.8 in snout; pectoral 1.1 to 1.2 in postorbital part of head; pelvics inserted under middle of length of pectoral and a little in advance of origin of first dorsal, about four scale rows; origin of anal a trifle behind origin of second dorsal; color in alcohol blackish above, silvery below, with five blackish blotches on lower sides, a little below lateral line, first in front of origin of anal a distance about equal to length of pectoral fin, second over origin of anal, third a little behind rear base of anal; fourth on middle of length of caudal peduncle, fifth base of caudal fin below lateral line; top of head black; tip of chin black; membrane on posterior margin of operculum blackish; upper edge of pectoral fin blackish; spinous dorsal blackish; soft dorsal and anal blackish except white tips; caudal with tips of upper and lower lobes whitish, rest of fin blackish; pectorals pale, except middle rays somewhat dusky, scales 10+80+10; 35 to 38 scales between origins of dorsal fins; dorsal rays V—11; anal 10. (Description based on specimens 178, 550 and 760 mm. in standard length.)

Sphyraena snodgrassi Jenkins

2*b*. Maxillary not reaching to below eye by a distance ½ eye; lower angle of preoperculum produced, not rounded; groove behind maxillaries partially covered by a fold of tissues that extends down from preorbital instead of upward from lower side of groove; distance between insertions of pectoral and pelvic fins 1.2 in postorbital part of head, 2.5 times in distance between dorsals, and 1.5 in snout; head 3⅒ in standard length; eye 2⅓ in snout; preorbital 2.2 in eye; postorbital part of head 1¼ in snout; fleshy interorbital 1.9 in maxillaries 2½ in snout; pectoral 1.1 in postorbital part of head; pelvics inserted under ⅔ way back along pectoral fin and considerably in front of first dorsal, between verticals a distance equal to 9/10 of eye; scales 6+80+7; dorsal rays V-10; anal 10. (Description based on a specimen 340 mm. in standard length.) Sphyraena obtusata Cuvier

1*b*. Scales about 120 to 130; distance between insertions of pectoral and pelvic fins 0.7 times in postorbital part of head, 2.1 times in distance between dorsals, and 1 in snout; maxillary not reaching to below eye by a distance almost equal to diameter of eye; lower angle of preoperculum produced so that posterior margin of preopercle is not evenly rounded; groove behind maxillaries covered by a fold of tissue that extends down from preorbital above instead of upward from below groove; head 3⅓ in standard length; eye 3 in snout; preorbital 1.8 in eye; postorbital part of head 1¼ in snout; fleshy interorbital 1.8 in maxillaries and 2.7 in snout; pectoral 1.1 in postorbital part of head; pelvics inserted a trifle in front of origin of dorsal and ¼ to ⅓ length of pectoral fin behind that fin; origin of anal about under origin of soft dorsal; color in alcohol blackish above silvery below, black extending down to include lateral line, then abruptly paler; both dorsals and caudal fin plain dusky; pelvics pale; anal pale but rays a little pigmented; inner side of base of pectoral blackish, fin pale dusky basally, and fading into hyaline distally; tip of chin with a pointed projecting fleshy tip; scales 16 + 134 + 16; about 60 scales between origins of dorsal fins; dorsal rays V — 10; anal 10. (In life this specimen had a lemon-yellow lateral stripe in middle of distance below lateral line above lateral line iridescent yellow, with a black band along middle of back.) ____________________ Sphyraena helleri Jenkins

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[8] I have not included species reported in the literature from these localities because the descriptions are not adequate for proper identification.

Genus SPHYRAENA Röse

Sphyraena Röse, Petri Artedi Angermannia—Sueci synonymia nominum piscium . . ., ed. 2, p. 112, 1793. (Type, *Esox sphyraena* Linnaeus.)

SPHYRAENA SNODGRASSI Jenkins

Sphyraena snodgrassi Jenkins, Bull. U. S. Fish Comm., vol. 19 (1899), p. 388, fig. 2, 1901.

That my two specimens are the same as *S. snodgrassi* seems certain; careful comparison is needed to prove that this species is the same as the one in the Atlantic, as indicated by Weber and de Beaufort and by Fowler. To aid in such a comparison, I have given a description in the preceding key.

115200, off Canton Island, April 25, 1939, Capt. J. N. Lewis, U.S.N., 1 specimen.
115199, off Rose Atoll, June 13, 1939, Lt. T. D. Shriver, U.S.N., 1 specimen.
52454, Apia, Samoa, Jordan and Kellog, 1 specimen.

SPHYRAENA OBTUSATA Cuvier

Sphyraena obtusata Cuvier, in Cuvier and Valenciennes, Histoire Naturelle des Poissons, vol. 3, p. 350, 1829.

52479, Apia, Samoa, Jordan and Kellog, 1 specimen.

SPHYRAENA HELLERI Jenkins

Sphyraena helleri Jenkins, Bull. U. S. Fish. Comm. vol. 19 (1899), p. 387. fig 1, 1901.

115198, off Rose Atoll, June 19, 1939, Lt. T. D. Shriver, U.S.N., 1 specimen.

Family POLYNEMIDAE

KEY TO THE SPECIES OF POLYNEMIDAE FROM THE PHOENIX AND SAMOAN ISLANDS

1*a*. Six free pectoral filaments; scales about 7+68+12; dorsal VIII–I, 13; anal II, 11; gill rakers about 12+1+16; pectoral 6+14.
Polydactylus sexfilis (Valenciennes)

1*b*. Five free pectoral filaments; scales about 6 or 7+60 to 65+12; dorsal VIII–I, 13; anal II, 11; gill rakers 11+1+15; pectoral 5+15.
Polydactylus plebeius (Bonnaterre)

Genus POLYDACTYLUS Lacepède

Polydactylus Lacepède, Histoire naturelle des poissons, vol. 5, p. 419, 1803. [Type, *Polydactylus plumierii* Lacepède (=*Polynemus virginicus* Linnaeus).]

POLYDACTYLUS SEXFILIS (Valenciennes)

Polynemus sexfilis Valenciennes, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 7, p. 515, 1831.

115195, Tau Island, reef at Siulagi Point, June 27, 1939, 4 specimens.
115194, Swains Island, reef, May 3 to 9, 1939, 2 specimens.

POLYDACTYLUS PLEBEIUS (Bonnaterre)

Polinemus plebeius Bonnaterre, Tableau encyclopédique . . . Ichthyologie, p. 183, pl. 74, fig. 309, 1788.

115739, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 1 specimen.
52476, Apia, Samoa, Jordan and Kellogg, 2 specimens.

Family ACANTHOCYBIIDAE

Genus ACANTHOCYBIUM Gill

Acanthocybium Gill, Proc. Acad. Nat. Sci. Philadelphia, 1862, p. 125. (Type, *Cybium sara* Bennett.)

ACANTHOCYBIUM SOLANDRI (Cuvier)

Cybium solandri Cuvier, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 8, p. 192, 1831.

115306, near Manua Islands, latitude 14°32′ S., longitude 170°4′ W., June 24, 1939, 1 specimen, caught by C. E. Stowe, U. S. N., ship's cook, U. S. S. *Bushnell.*

Family CORYPHAENIDAE

Genus CORYPHAENA Linnaeus

Coryphaena Linnaeus, Systema naturae, ed. 10, vol. 1, p. 261, 1758. (Type, *Coryphaena hippurus* Linnaeus.)

CORYPHAENA HIPPURUS Linnaeus

Coryphaena hippurus Linnaeus, Systema naturae, ed. 10, p. 261, 1758.

115308, near Manua Islands, latitude 14°32′ S., longitude 170°4′ W., June 24, 1939, 1 specimen caught by C. E. Stowe, U. S. N., ship's cook, U. S. S. *Bushnell.*

Family CARANGIDAE

KEY TO THE GENERA AND SPECIES OF CARANGIDAE FROM THE PHOENIX AND SAMOAN ISLANDS BASED ON SPECIMENS IN THE NATIONAL MUSEUM (see table 8)

1*a*. Dorsal and anal fins followed by a single finlet; depth about 4½ to 5 in length, head about 4½ to 5½ in length.
  2*a*. Dorsal rays VI–I, 25 or 26–2; anal rays II–I, 16 to 18–2.
    Elagatis bipinnulatus (Quoy and Gaimard)
  2*b*. Dorsal rays VIII–I, 30 to 32–1; anal rays II–I, 26 to 28–1.
    Decapterus sanctae-helenae[9] (Quoy and Gaimard)

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[9] No specimen in National Museum from Phoenix and Samoan Islands but included here for sake of completeness of key.

1*b*. Dorsal and anal fin not followed by finlets, although in *Scomberoides* several fin rays may appear almost detached posteriorly.

3*a*. Shoulder girdle with a deep furrow near its juncture with the isthmus, and a fleshy projection above it.
Trachurops crumenophthalmus (Bloch)

3*b*. Shoulder girdle normal, without groove or projection.

4a. Lateral line entirely unarmed, with a gentle curve over pectoral fin then gradually approaching midaxis of body posteriorly.

5a. Depth of body 1½ to 2½ in length; lower jaw included; anterior lobe of dorsal and anal fins elongate or falcate.

6*a*. Dorsal rays VII, 23 or 24; anal rays III, 22 or 23; gill rakers on first gill arch 9 or 10+1+15, totaling about 25 or 26.
Trachinotus baillonii (Lacepède)

6*b*. Dorsal rays VII, 18 or 19; anal rays III, 17; gill rakers on first gill arch 5 or 6+1+12 or 13-------- Trachinotus ovatus (Linnaeus)

5*b*. Depth of body about 3½ times in standard length; lower jaw a trifle longer than upper; lobes of dorsal and anal fins not elongate or falcate; pectoral fin about length of mouth; maxillary reaches to under rear margin of eye; dorsal rays VI–19 (last seven rays appear almost separated from one another); anal rays II–I, 24 (last seven rays appear almost separated from one another); pectoral rays about 16; gill rakers 7+1+19 on first gill arch.
Scomberoides sancti-petri (Cuvier)

4*b*. Lateral line armed with keeled scales posteriorly, most highly developed on caudal peduncle.

7*a*. Dorsal fin rays VIII–I, 30 to 32; anal rays II-I, 25 or 26; about 60 scales along straight portion of lateral line; gill rakers on first gill arch 9+1+17 to 22 totaling 27 to 32------ Caranx ferdu (Forskål)

7*b*. Dorsal soft rays fewer than 26, soft anal rays fewer than 23.

8*a*. Lateral line gently arched over pectoral fin, length of this arch from upper angle of gill opening to where lateral line straightens out along midaxis longer than or as long as straight part of lateral line.

9*a*. Dorsal and anal fins with anterior rays greatly elongate; last 5 to 8 rays normal; dorsal rays VIII–I, 21; anal II–I, 16 or 17; scales along straight portion of lateral line about 42; gill rakers 7 or 8+1+16 or 17; breast and thorax naked.
Caranx armatus (Forskål)

9*b*. Dorsal and anal fins without elongate rays; dorsal fin rays VIII–I, 23; anal II–I, 20; scales along straight portion of lateral line about 43; gill rakers on first gill arch 13+1+27; breast and thorax scaled--- Caranx lundini (Jordan and Seale)

8*b*. Lateral line with an abrupt arch over pectoral fin, length of this arch from upper angle of gill opening to where lateral line straightens out along midaxis shorter than straight portion, which has keeled scales at least posteriorly.

10*a*. Forty to fifty scales along straight portion of lateral line.

11*a*. Body without cross bands except in young up to 3 or 4 inches long; dorsal rays VIII–I, 22 or 23; anal II–I, 18 to 20 (usually 19); gill rakers on first gill arch 7 or 8+1+17 or 18; scales along straight portion of lateral line 40 to 45; breast scaled---------------- Caranx melampygus Cuvier

11*b*. Body of adult with about 12 vertical brownish bands, first through eye, second across rear of opercle past base of pectoral, rest alternate, next narrow, then wider bands, etc.; dorsal rays VII–I, 20; anal II–I, 17; gill rakers 9+1+23; scales along straight portion of lateral line about 46; breast scaly........................ Caranx speciosus (Forskål)

10*b*. Fewer than 40 scales along straight portion of lateral line.

12*a*. Scales along straight portion of lateral line about 27 or 28; dorsal rays VII–I, 21 or 22; anal II–I, 18 or 19; gill rakers about 7+1+18 or 19; breast scaly.
Caranx adscensionis (Osbeck)

12*b*. Scales along straight portion of lateral line 30 to 38.

13*a*. Breast naked, except for a small patch just in front of pelvic base; length of maxillaries about 2⅓ times in head and equal to distance from tip of snout to center or front of pupil; dorsal rays VIII–I, 21 to 23; anal II–I, 18; gill rakers about 7+1+18; scales along straight portion of lateral line about 35 to 38.. Caranx ignobilis (Forskål)

13*b*. Breast fully scaled; length of maxillaries about 2 times in head and equal to distance from tip of snout to behind pupil; dorsal rays VIII–I 21 or 22; anal II–I, 16 to 18; gill rakers 7 or 8+1+17 to 19; scales along straight portion of lateral line 30 to 38.
Caranx sexfasciatus Quoy and Gaimard

Genus ELAGATIS Bennett

Elagatis Bennett, Narrative of a whaling voyage around the globe, vol 2, p. 283, 1840. (Type, *Seriola bipinnulata* Quoy and Gaimard.)

ELAGATIS BIPINNULATUS (Quoy and Gaimard)

Seriola bipinnulata Quoy and Gaimard, Voyage autour du monde . . . *Uranie*, Zool., p. 363, pl. 61, fig. 3, 1825.

115307, off McKean Island, latitude 3°35′ S., longitude 174°6′ W., April 30, 1939, caught by Capt. Lewis and Mr. Garrison of the U. S. S. *Bushnell.*

Genus TRACHUROPS Gill

Trachurops Gill, Proc. Acad. Nat. Sci. Philadelphia, 1862, p. 238. [Type *Scomber plumieri* Bloch (=*S. crumenophthalmus* Bloch).]

TRACHUROPS CRUMENOPHTHALMUS (Bloch)

Scomber crumenophthalmus Bloch, Naturgeschichte der ausländischen Fische, vol. 7, pt. 10, p. 77, pl. 343, 1793.

115316, Tutuila Island, reef at Alofau, June 3, 1939, 1 specimen.
115318, Tau Island, reef at Siulagi Point, June 27, 1939, 1 specimen.
115317, Tutuila Island, off dock Pago Pago Bay, June 6, 1939, 4 specimens.
115315, Rose Island lagoon, June 12–20, 1939, 6 specimens.
52504, Pago Pago, Samoa, Jordan and Kellogg, 4 specimens.

Genus TRACHINOTUS Lacepède

Trachinotus Lacepède, Histoire naturelle des poissons, vol. 3, p. 78, 1802. (Type, *Scomber falcatus* Forskål.)

TRACHINOTUS BAILLONII (Lacepède)

Caesiomorus baillonii LACEPÈDE, Histoire naturelle des poissons, vol. 3, pp. 92, 93, pl. 3, fig. 1, 1802.

115323, Enderbury Island, reef, May 15–19, 1939, 1 specimen.

115322, Canton Island, seined in channel and lagoon, April 24, 1939, L. P. Schultz and Arthur Petit, U. S. N., 3 specimens.

TRACHINOTUS OVATUS (Linnaeus)

Gasterosteus ovatus LINNAEUS, Systema naturae, ed. 10, p. 296, 1758.

52312, Apia, Samoa, Jordan and Kellogg, 1 specimen.

82949, Samoa, Wilkes Exploring Expedition, 1 specimen.

Genus SCOMBEROIDES Lacepède

Scomberoides LACEPÈDE, Histoire naturelle des poissons, vol. 3, p. 50, 1802. [Type, *Scomberoides commersonianus* Lacepède (=*Scomber lysan* Forskål).]

SCOMBEROIDES SANCTI-PETRI (Cuvier)

Chorinemus sancti-petri CUVIER, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 8, p. 379, pl. 236, 1831.

115331, Canton Island, off channel, April 27, 1939, caught by Mr. Jessie, sailor on the U. S. S. *Bushnell*, 1 specimen, 435 mm. in standard length.

52361, Apia, Samoa, Jordan and Kellogg, 3 specimens.

Genus CARANX Lacepède

Caranx LACEPÈDE, Histoire naturelle des poissons, vol. 3, p. 57, 1802. [Type, *Scomber carangus* Bloch (=*Caranx hippos* Linnaeus), as restricted by Bleeker, the first reviser.]

CARANX FERDU (Forskål)

Scomber ferdu FORSKÅL, Descriptiones animalium . . ., pp. 12, 55, 1775.

115324, Rose Island, lagoon, June 16, 1939, 2 specimens.

51729 (type of *Caranx gilberti* Jenkins), Samoa, 1902, U. S. Bur. Fisheries.

CARANX ARMATUS (Forskål)

Sciaena armata FORSKÅL, Descriptiones animalium . . ., p. 53, 1775.

51728, Samoa, 1902, U. S. Bur. Fisheries, 1 specimen.

51839, Apia, Samoa, U. S. Bur. Fisheries, 1 specimen.

CARANX LUNDINI (Jordan and Seale)

Decapterus lundini JORDAN and SEALE, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 229, fig. 27, 1906.

51727 (type of *Decapterus lundini*), Samoa, 1902, U. S. Bur. Fisheries.

CARANX MELAMPYGUS Cuvier

Caranx melampygus CUVIER, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 9, p. 116, 1833.

115310, Hull Island, reef, July 12-15, 1939, 8 specimens.

115314, Canton Island, seined in channel and lagoon, April 24, 1939, L. P. Schultz and Arthur Petit, 1 specimen.

115312, Tutuila Island, Cocoanut Point, June 4, 1939, 1 specimen.

115313, Tutuila Island, reef at Alofau, June 3, 1939, 3 specimens.

115311, Swains Island, seined on reef at night, May 4, 1939, 5 specimens.

115309, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 6 specimens.

115326, Hull Island, channel, July 14-15, 1939, 4 specimens (field numbers U-01033, U-01049, U-01063, U-01064).

115325, Enderbury Island, off reef, taken on trolling line by Lt. Tom Shriver, U.S.N., 1 specimen.

38248, Apia, Samoa, W. H. Jones, 2 specimens.

41556, Samoan Islands, C. H. White, 2 specimens.

45088, Samoa, Lord Lilford, 2 specimens.

52360, Apia, Samoa, Jordan and Kellogg, 2 specimens.

CARANX SPECIOSUS (Forskål)

Scomber speciosus FORSKÅL, Descriptiones animalium . . ., p. 12, 1775.

52333, Apia, Samoa, Jordan and Kellogg, 1 specimen.

CARANX ADSCENSIONIS (Osbeck)

Scomber adscensionis (Forster) OSBECK, A voyage to China and the East Indies, vol. 2, p. 94, 1771.

115327, off Enderbury Island, July 20, 1939, caught by Lt. Tom Shriver, U.S.N., while trolling, 1 specimen.

115328, off Canton Island, April 24, 1939, caught by Capt. J. N. Lewis, U.S.N., and Dr. Hubbard, U.S.N., while trolling, 1 specimen.

115329, off Canton Island, April 25, 1939, caught by Capt. J. N. Lewis, U.S.N., and Mr. Martin, U.S.N., while trolling, 1 specimen.

115330, Rose Island, lagoon, July 20, 1939, 1 specimen.

CARANX IGNOBILIS (Forskål)

Scomber ignobilis FORSKÅL, Descriptiones animalium . . ., pp. 12, 55, 1775.

52447, Apia, Samoa, Jordan and Kellogg, 1 specimen.

117641, Apia, Samoa, W. H. Jones, 3 specimens.

52365, Apia, Samoa, Jordan and Kellogg, 1 specimen.

CARANX SEXFASCIATUS Quoy and Gaimard

Caranx sexfasciatus QUOY and GAIMARD, Voyage autour du monde . . . *Uranie*, Zool., p. 358, pl. 65, fig. 4, 1825.

115319, Tutuila Island, reef at Alofau, June 3, 1939, 5 specimens.

115320, Swains Island, reef, May 3-9, 1939, 1 specimen.

115321, Tutuila Island, mouth of stream at village of Pago Pago, June 2, 1939, 6 specimens.

94741, Apia, Samoa, Jordan and Kellogg, 2 specimens.

52363, Apia, Samoa, Jordan and Kellogg, 4 specimens.

TABLE 8.—*Counts made on various species of Carangidae*

Species	Dorsal rays																		Anal rays													
	Spines			Soft rays															Spines			Soft rays										
	VII	VIII-I		18	19	20	21	22	23	24	24	26	27	28	29	30	31	32	II	III-I		16	17	18	19	20	21	22	23	24	25	26
Caranx sexfasciatus		11	11				6	5											11		11	2	4	5								
Caranx adscensionis	2		2				1	1											2		2			1	1							
Caranx melampygus		9	9					5	4										8		8			1	6	1						
Caranx ignobilis		5	5				1	1	3										5		5			5								
Caranx speciosus	1		1			1													1		1		1									
Caranx ferdu		3	3													1	1	1	3		3										2	1
Caranx lundini		1	1						1										1		1					1						
Caranx armatus		2	2				2												2		2	1	1									
Trachinotus baillonii	4								2	2										4								2	2			
Trachinotus ovatus	2			1	1															2			2									
Trachurops crumenophthalmus	3		3								1	1		1					3		3							1	1	1		

Species	Number of scales (usually keeled) in straight portion of lateral line																																	
	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Caranx sexfasciatus				1	2	2	1	3	1	3		1																						
Caranx adscensionis	1	3																																
Caranx melampygus														3	2	8	1	3	3															
Caranx ignobilis									1	2		2																						
Caranx speciosus																				1														
Caranx ferdu																																		2
Caranx lundini																	1																	
Caranx armatus																1																		

TABLE 8.—*Counts made on various species of Carangidae*—Continued

Species	Number of gill rakers on first gill arch																								
	Above angle									At angle	Below angle														
	5	6	7	8	9	10	11	12	13	1	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Caranx sexfasciatus			2	1						3						2		1							
Caranx adscensionis			2							2							1	1							
Caranx melampygus			2	2						4						1	3								
Caranx ignobilis			1							1							1								
Caranx speciosus					1					1												1			
Caranx ferdu					3					3						1	1				1				
Caranx lundini									1	1															
Caranx armatus			1	1						2					1	1									
Trachinotus baillonii					2	1				3				3											
Trachinotus ovatus	1	1								2	1	1													
Trachurops crumenophthalmus					1	1				2															

Species	Below angle					Total gill rakers																			
	27	28	29	30	31	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
Caranx sexfasciatus							2			1															
Caranx adscensionis								1	1																
Caranx melampygus								2	2																
Caranx ignobilis								1																	
Caranx speciosus															1										
Caranx ferdu									1	1				1											
Caranx lundini	1																						1		
Caranx armatus							2																		
Trachinotus baillonii							2	1																	
Trachinotus ovatus																									
Trachurops crumenophthalmus				1	1																		2		

Family APOGONIDAE

KEY TO THE SPECIES OF APOGONIDAE FOUND IN THE PHOENIX AND SAMOAN ISLANDS

1*a*. No canine teeth in jaws even at symphysis of lower or upper jaws; if teeth are present they are villiform and in narrow to wide bands; anal rays II, 7 to 17; preoperculum with double edge, the posterior not produced; anus just in front of origin of anal fin or as far distant as diameter of pupil.

2*a*. Margin of anterior edge of preopercle serrated or strongly toothed; margin of posterior edge of preopercle strongly serrated or toothed.

3*a*. Dorsal fin rays VI–I, 9 or 10; second spine of dorsal fin longest, so that first, which is about equal to pupil, is contained 3.8 times in second; black saddles or vertical color bars as follows: One below origin of spinous dorsal fin; second below origin of soft dorsal fin; third below last third of soft dorsal fin, and this extends to the rear base of the anal fin; caudal peduncle with a blackish spot one-half size of pupil on end of lateral line; dark spot on opercle about size of pupil; pectoral fin rays about 14; gill rakers 5 or 6+17; scales 2+24+5; anal rays II, 8------------------------------------ Apogon trimaculatus Cuvier

3*b*. Dorsal fin rays VII–I, 9; third dorsal spine longest; palatines usually with teeth though sometimes toothless; suborbitals usually with spines; first dorsal spine 2¼ to 3 times in second; second 1.9 to 2¼ in third; color as follows: Streak of black across soft dorsal and anal one-fourth up from base of fins and ending at tips of last rays; a black blotch, variable in size just in front of base of caudal fin rays on end of caudal peduncle, the most intense black above lateral line, but in some specimens this black blotch extends toward ventral side of peduncle where pigment fades out; dorsal and ventral edges of caudal fin with white margin inside of which is a narrow blackish streak; tip of snout to middle of eye with blackish streak sometimes continuing to end of caudal peduncle; membranes from first to fourth dorsal spines blackish; sometimes there is a distinct blackish blotch under soft dorsal reaching lateral line; peritoneum and intestine whitish, the stomach sometimes dusky; anal rays II, 8 or 9; pectoral 12 or 13; scales 2+25 or 26+5 to 7; gill rakers 4 or 5+14 to 17----------- Apogon frenatus Valenciennes

2*b*. Margin of anterior edge of preopercle not serrated.

4*a*. Margin of posterior edge of preopercle with some serrations, portion below angle not flexible but stiff and serrated; lateral line complete.

5*a*. Anal fin rays II, 14–16; at base of caudal fin and on caudal peduncle occurs a large blackish blotch; (in large adults an opercular spot is apparent); dorsal fin rays VI–I, 9; pectoral 13; gill rakers 5+15; scales 2+25+6; palatine teeth present; peritoneum silvery; intestine with black spots---------------- Archamia lineolata (Ehrenberg)

5*b*. Anal fin rays II, 8 or 9.

6*a*. Dorsal rays VI–I, 9.

7*a*. Second and third dorsal spines very elongate and flexible, first spine 4½ times in second; second longest; pupil is contained 2½ times in first dorsal spine; gill rakers about 7+1+23; anal rays II, 9; pectoral about 14; scales about 2+25+5 or 6; color of body plain, no spots or streaks; spinous dorsal black edged. Apogon graeffei Günther

7*b*. Dorsal spines stiff, not elongate; first dorsal spine 3½ in second, second longest; first dorsal spine equal to or longer than pupil; gill rakers about 6+18; anal rays II, 8; pectoral about 14;

scales about 2+22 to 25+6; a small black spot, smaller than pupil at base of caudal fin rays on end of lateral line and at end of a narrow longitudinal black streak along axis of body; dark opercular spot--------------- **Apogon ceramensis Bleeker**

6*b*. Dorsal fin rays VII–I, 9 or 10; anal fin rays II, 8.

8*a*. Color pattern not of blackish longitudinal stripes but on side of body four to eight vertical color bars under dorsal fins, sometimes these are rather indistinct; no teeth on palatines; opercle with silvery spot, posteriorly; dorsally and ventrally around this spot is blackish pigment; a prominent narrow black streak from lower margin of eye backward and downward across cheek; a dark saddle on caudal peduncle extends from middorsal line to below lateral line, but in young this meets its fellow on ventral side of the caudal peduncle; first dorsal spine 3½ in second; second 2 times in third; third longest; pectoral rays about 13; scales 2+25+5; gill rakers 6 or 7+18 to 20, long and slender-----------------**Apogon bandanenis Bleeker**

8*b*. Color pattern consists of five or six longitudinal blackish color streaks on sides of body as follows: (1) A middorsal streak divides at origin of spiny dorsal and continues along dorsal bases joining again on caudal peduncle; (2) one begins over orbit and runs above lateral line along upper part of caudal peduncle; (3) median one extends from snout through eye along axis of body, more intense black below soft dorsal, and again more blackish in front of base of caudal fin rays; (4) this one runs below orbit, forms a black opercular blotch and another spot on base of pectoral continuing along midventral side; (5) from tip of chin across maxillaries through branchiostegals; (6) along dentaries, joining number 5 on branchiostegals; soft dorsal and anal fin rays have a black streak just above base of fin; first dorsal spine 2¾ in second; second 2⅕ in third, third longest; pectoral rays 14 or 15; gill rakers 5 or 6+14 to 16; scales 2+24 to 26+5 or 6.

9*a*. Color streaks 2 and 4 (above) continue on caudal fin rays, second streak has a downward trend toward midposterior tip of fin but is interrupted by a light streak above midline of fin; number 4 is the same but is directed dorsally; number 3 streak continues to tip of middle caudal fin rays.
Apogon novemfasciata Cuvier

9*b*. Color streaks do not continue on caudal fin rays.
Apogon aroubiensis Hombron and Jacquinot

4*b*. The margin below angle of posterior edge of preopercle flexible and not serrated.

10*a*. Above angle on posterior edge of preopercle stiff and serrated; caudal fin truncate; dorsal fin rays VI–I, 9; anal II, 8; pectoral fin rays 12 or 13; scales 2+22 to 25+6 or 7; peritoneum dusky, intestine light colored; palatines with teeth; second dorsal spine longest.

11*a*. Gill rakers 2 or 3+12 or 13; faint color spot silvery or blackish on opercle with small patch of black pigment above it; scales a short space in front of posterior edge are pigmented, this most prominent in predorsal region and along upper back, body and fins plain color otherwise; sometimes a trace of dark pigment cells along midaxis at base of caudal fin and forward on caudal peduncle for a short distance__________ Apogon doryssa (Jordan and Seale)

11*b*. Gill rakers 5+14 to 16; a broad black area covering most of caudal peduncle, except its upper and lower sides, this black marking extending out and covering lower half of caudal fin; depth of caudal peduncle 1.9 times in its length; first dorsal spine as long as or longer than pupil, 3 to 4 times in second. Apogon crassiceps Garman

10*b*. Margins of both anterior and posterior edges of preopercle not serrated but smooth; third dorsal spine longest; dorsal fin rays VII–I, 9; anal II, 7 or 8; caudal fin rounded.

12*a*. No black spot on operculum; body and fins usually plain or with vertical color bars[10]; lateral line incomplete; pectoral fin rays 12 or 13; gill rakers on first gill arch 3 or 4+11 or 12; scales about 2+21+6; palatine teeth present. Apogon brachygramma[10] (Jenkins)

12*b*. A black opercular spot with white margin; lateral line usually incomplete but sometimes rudimentary pores occur on caudal peduncle.

13*a*. Side of body with about eight rows of longitudinal placed black spots, these spots occurring near center of each scale: (1) Four spots just below spinous dorsal and interspace between dorsal fins; (2) series of spots along next row of scales, and rows 3 to 7 follow the corresponding scale rows; eight row occurs from midlength of pelvics to base of anal fin; no spots on fins; along midventral and middorsal line of caudal peduncle are a few black spots too; a light streak across cheek from lower fourth of eye, and bordering it below are black streaks, the lower one very distinct; a black streak occurs above lower opercular spine, area over spine light colored; gill rakers 3 or 4+12 or 13; pectoral fin rays 12 or 13; scales 2+22 or 23+6, usually there are palatine teeth present. Apogon isostigma (Jordan and Seale)

13*b*. Sides of body mottled or with about eight or nine vertical bars; fins and lower jaw barred; no black spots arranged in longitudinal rows; opercular spot similar to that of *isostigma* except there is a black rim posteriorly to narrow white line around black opercular spot; scales 2+23+5 or 6; pectoral rays 13; gill rakers 4+12______ Apogon auritus Valenciennes

1*b*. Canine teeth present in jaws; dorsal rays VI–I, 9; anal II, 8.

14*a*. Tip of lower jaw with a pair or two of enlarged canines; no band of villiform teeth in lower jaw; lower jaw with a single series of large conical teeth, a few of which are enlarged canines widely spaced on sides of jaw and between which are a few small conical teeth in an irregular row; canine teeth in upper jaw in a group each side of a small toothless space at symphysis, no villiform teeth at tip of upper jaw, but following canines occurs a wide band posteriorly; gill rakers about 5+19; pectoral rays about 13; 7 to 9 dark brown streaks on side of body and a broad diffuse black band at base of caudal fin. Cheilodipterus lineatus Linnaeus

14*b*. No canines at tip of lower jaw, but three to six pairs of enlarged canines located along midsides, tip of lower jaw with villiform teeth, these extending as a band along dentary; tip of upper jaw with a pair of patches of villiform teeth at symphysis, between which is a small toothless space; at sides of tip of upper jaw are two or three pairs of enlarged canines followed posteriorly by a band of villiform teeth; a black spot at base of caudal fin rays on caudal peduncle at axis; six black streaks on one side of body, including middorsals and midventral ones; upper edge of eye pigmented; membrane between first to third dorsal spines blackish; second dorsal spine longest; gill rakers 3+13; pectoral rays 12; scales 2+23 to 25+5.

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[10] There are traces of vertical color bars on the types of *Foa vaiulae* Jordan and Seale, *Fowleria brachygrammus* Jenkins, and *Foa fo* Jordan and Seale.

Paramia quinquelineata (Cuvier)

Genus ARCHAMIA Gill

Archamia GILL, Proc. Acad. Nat. Sci. Philadelphia, 1853, p. 81. (Type, *Apogon bleekeri* Günther.)

ARCHAMIA LINEOLATA (Ehrenberg)

Apogon lineolatus EHRENBERG, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, p. 160, 1828.

52203, Apia, Samoa, Jordan and Kellogg, 32 specimens.
89255, Apia, Samoa, C. H. White, 5 specimens.

Genus APOGON Lacepède

Apogon LACEPÈDE, Histoire naturelle des poissons, vol. 3, p. 411, 1802. (Type, *Apogon ruber* Lacepède.)

APOGON TRIMACULATUS Cuvier

Apogon trimaculatus CUVIER, in Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 2, p. 156, 1828.

Amia koilomotodon (Bleeker), JORDAN and SEALE, Bull, U. S. Bur. Fish., vol. 25 (1905), p. 240, fig. 34, 1906.

51733, Apia, Samoa, 1902, Jordan and Kellogg, 3 specimens.

APOGON FRENATUS Valenciennes

Apogon frenatus VALENCIENNES, Nouv. Ann. Mus. Hist. Nat., vol. 1, p. 57, pl. 4, fig. 4, 1832.

Amia exostigma JORDAN and STARKS, *in* Jordan and Seale, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 238, fig. 31, 1906 (Apia; Pago Pago).

Amia snyderi (Jordan and Evermann), JORDAN and SEALE, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 237, 1906 (Apia; Pago Pago).

114969, Tutuila Island, reef at Alofau, June 3, 1939, 1 specimen.
114970, Canton Island, lagoon, April 23 to May 12, 1939, 3 specimens.
51732 (type and 4 cotypes of *A. exostigma*), Apia, Samoa, 1902, Jordan and Kellogg.
52390, Pago Pago, Samoa, 1902, Jordan and Kellogg, 12 specimens.
56987, Apia, Samoa, Jordan and Kellogg, 2 specimens.

APOGON GRAEFFEI Günther

Apogon graeffei GÜNTHER, Andrew Garrett's Fische der Südsee, p. 22, pl. 20, fig. E, 1873.

Mionorus graeffei (Günther) JORDAN and SEALE, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 247, fig. 41, 1906.

15110, Samoan Islands, A. B. Steinberger, 1 specimen.
20512, Samoan Islands, A. B. Steinberger, 1 specimen.
52407, Apia, Samoa, Jordan and Kellogg, 5 specimens.

APOGON CERAMENSIS Bleeker

Apogon ceramensis BLEEKER, Nat. Tijdschr. Ned. Ind., vol. 3, p. 256, 1852.

Amia lateralis (Valenciennes) JORDAN and SEALE, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 246, fig. 39, 1906.

51814, Apia, Samoa, 1902, Jordan and Kellogg, 7 specimens.

APOGON BANDANENSIS Bleeker

Apogon bandanensis BLEEKER, Nat. Tijdschr. Ned. Ind., vol. 7, p. 95, 1854.

Amia savayensis (Günther) JORDAN and SEALE, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 239, fig. 33, 1906.

114973, Tutuila Island, reef at Alofau, June 3, 1939, 4 specimens.
114975, Canton Island, lagoon, May 25–26, 1939, 14 specimens.
114976, Tau Island, reef at Siulagi, June 27, 1939, 2 specimens.
114974, Hull Island, channel, July 8–12, 1939, 47 specimens.
114970, Canton Island, coral heads in lagoon, May 23–25, 1939, 76 specimens.
52432, Apia, Samoa, Jordan and Kellogg, 30 specimens.
58522, Pago Pago, Samoa, Jordan and Kellogg, 21 specimens.

APOGON NOVEMFASCIATA Cuvier

Apogon novemfasciatus CUVIER, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 2, p. 154, 1828.—JORDAN and SEALE, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 242, figs. 36, 37, 1906.

114956, Tutuila Island, reef at Alofau, June 3, 1939, 53 specimens.
114952, Swains Island, reef, May 3–9, 1939, 1 specimen.
114955, Hull Island, channel, July 7–17, 1939, 2 specimens.
114954, Rose Island, reef, June 11–14, 1939, 2 specimens.
114953, Tutuila Island, Fagasa Bay reef, June 5, 1939, 9 specimens.
114951, Tau Island, reef at Siulagi Point, June 27, 1939, 10 specimens.
115740, Canton Island, reef at Ocean, April 25–28, 1939, 1 specimen.
15108, Samoan Islands, A. B. Steinberger, 3 specimens.
41566, Samoan Islands, 1889, C. H. White, 1 specimen.
51730, Apia, Samoa, 1902, Jordan and Kellogg, 8 specimens.
61172, Apia, Samoa, Jordan and Kellogg, 4 specimens.

APOGON AROUBIENSIS Hombron and Jacquinot

Apogon aroubiensis HOMBRON and JACQUINOT, Voyage au Pôle Sud . . ., Poissons, p. 31, 1853.

Amia aroubiensis (Hombron and Jacquinot) JORDAN and SEALE, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 241, fig. 35, 1906.

114971, Tutuila Island, reef at Pago Pago Bay entrance, June 2, 1939, 1 specimen.
51813, Apia, Samoa, 1902, Jordan and Kellogg, 5 specimens.

APOGON DORYSSA (Jordan and Seale)

Amia doryssa Jordan and Seale, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 245, fig. 39, 1906.

Amia erythrina (Snyder) Jordan and Seale, *ibid.*, p. 245 (Apia; Pago Pago).

114962, Canton Island, reef in wide channel; May 13, 1939, 2 specimens.
114957, Canton Island, lagoon, from coral heads, May 23–25, 1939, 32 specimens.
114966, Canton Island, lagoon, May 25–26, 1939, 46 specimens.
114959, Tutuila Island, reef at Alofau, June 3, 1939, 2 specimens.
114958, Canton Island, lagoon, April 23 to May 12, 1939, 3 specimens.
114961, Hull Island, reef, July 12-15, 1939, 2 specimens.
114960, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 1 specimen.
114963, Hull Island, channel, July 7–17, 1939, 1 specimen.
114964, Rose Island, reef June 11–14, 1939, 4 specimens.
51812 (type *A. doryssa*), Apia, Samoa, 1902, Jordan and Kellogg.
52287, Pago Pago, Samoa, Jordan and Kellogg, 4 specimens.

APOGON CRASSICEPS Garman

Apogon crassiceps Garman, Bull. Mus. Comp. Zool., vol. 39, p. 230, 1903.

Amia crassiceps (Garman) Jordan and Seale, Bull. U. S. Bur. Fish., vol 25 (1905), p. 239, fig. 32, 1906 (Apia).

Amia fusca (Quoy and Gaimard) Jordan and Seale, *ibid.*, p. 244, fig. 38 (Apia).

Although the two species, *A. crassiceps* and *A. fusca*, shown by Jordan and Seale were figured with a different caudal fin in their figs. 32 and 38, they are very similar, and the caudal fin of "*A. fusca*," though badly damaged, appears to have been somewhat concave. Until additional material is available for statistical study, these species, along with many others referred to the genus *Apogon*, cannot be separated with accuracy.

51731, Apia, Samoa (*A. fusca* of Jordan and Seale), Jordan and Kellogg, 1 specimen.

51278, Apia, Samoa (*A. crassiceps* of Jordan and Seale), Jordan and Kellogg, 1 specimen.

APOGON BRACHYGRAMMA (Jenkins)

Fowleria brachygrammus Jenkins, Bull. U. S. Fish Comm., vol. 22 (1902), p. 447, fig. 20, 1903.

Foa fo Jordan and Seale, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 248, fig. 42, 1906.

Foa vaiulae Jordan and Seale, *ibid.*, p. 249, fig. 43.

51734 (type of *Foa vaiulae*), Apia, Samoa, 1902, Jordan and Kellogg.
51735 (type of *Foa fo*), Apia, Samoa, 1902, Jordan and Kellogg.

APOGON ISOSTIGMA (Jordan and Seale)

Apogonichthys isostigma Jordan and Seale, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 251, fig. 45, 1906.

114967, Canton Island, lagoon, coral heads, May 23–25, 1939, 3 specimens.
114968, Canton Island, lagoon, May 25, 26, 1939, 2 specimens,
51736 (types and 4 cotypes of *A. isostigma*), Apia, Samoa, 1902, Jordan and Kellogg.

APOGON AURITUS Valenciennes

Apogon auritus VALENCIENNES, in Cuvier and Valenciennes, Histoire Naturelle des Poissons, vol. 7, p. 443, 1831.

Apogonichthys variegatus (Valenciennes) JORDAN and SEALE, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 250, 1906.

Apogonichthys marmoratus (Alleyne and Macleay) JORDAN and SEALE, *ibid.*, p. 250, fig. 44.

15134, Samoan Island, A. B. Steinberger, 1 specimen.
52250, Apia, Samoa, Jordon and Kellogg, 2 specimens.
52258, Pago Pago, Samoa, Jordan and Kellogg, 2 specimens.
52286, Pago Pago, Samoa, Jordan and Kellogg, 6 specimens.

Genus CHEILODIPTERUS Lacepède

Cheilodipterus LACEPÈDE, Histoire naturelle des poissons, vol. 3, p. 539, 1802. (Type, *Cheilodipterus lineatus* Lacepède, as restricted by Cuvier and Valenciennes.)

CHEILODIPTERUS LINEATUS Linnaeus

Cheilodipterus lineatus LINNAEUS, Systema naturae, ed. 10, p. 293, 1758.

Paramia macrodon (Lacepède) JORDAN and SEALE, Bull. U. S. Bur. Fish, vol. 25 (1905), p. 252, 1906 (Apia).

52410, Apia, Samoa, Jordan and Kellogg, 3 specimens.

Genus PARAMIA Bleeker

Paramia BLEEKER, Ned. Tijdschr. Dierk., vol. 1, 233, 1863. (Type, *Cheilodipterus quinquelineata* Cuvier and Valenciennes, not *Cheilodipterus lineatus* Lacepède as in Jordan's "Genera of Fishes.")

Jadamga SCHULTZ, Proc. U. S. Nat. Mus., vol. 88, p. 416, 1940 (Type, *Cheilodipterus quinquelineata* Cuvier and Valenciennes); Copeia, 1940, No. 3, p. 203.

PARAMIA QUINQUELINEATA (Cuvier)

Cheilodipterus quinquelineatus CUVIER, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 2, p. 167, 1828.

Paramia quinquelineata (Curvier) JORDAN and SEALE, Bull. U. S. Bur. Fish, vol. 25 (1905), p. 252, 1906.

114979, Canton Island, lagoon, May 25–26, 1939, 32 specimens.
114980, Hull Island, channel, July 7–17, 1939, 4 specimens.
114978, Canton Island, coral heads in lagoon, May 23–25, 1939, 3 specimens.
114977, Tutuila Island, reef at Alofau, June 3, 1939, 1 specimen.
52296, Apia, Samoa, Jordan and Kellogg, 7 specimens.

Family AMBASSIDAE

KEY TO THE AMBASSIDAE FROM THE SAMOAN ISLANDS

1*a*. A black line from behind operculum extending along midaxis of body to base of caudal fin, distinct posteriorly, faded anteriorly; membrane between second and third dorsal spine blackish, tip black; middle region of back blackish brown, sides lighter in color; basal region of caudal fin darkish, this extending out on lobes of fin one-half distance; blackish along base of anal fin and also on ventral edge of caudal peduncle; lower jaw blackish;

snout blackish; margin of scales on upper sides brownish; dorsal fin rays VII, I, 9 or 10; anal III, 10 or 11; pectoral 13; gill rakers 7 or 8+1+22 or 23; scales 4 or 5+28 or 29+6 (see table 9).
Ambassis lafa Jordan and Seale

1*b*. A narrow silvery band along midaxis, distinct posteriorly with faint shading of brown; tip of spinous dorsal blackish; tip of lower jaw blackish; dorsal fin rays VII, I, 9; anal III, 10, pectoral 13; gill rakers 8+1+21; scales 3+28 or 29+5____________ **Ambassis vaivasensis Jordan and Seale**

Genus AMBASSIS Cuvier and Valenciennes

Ambassis (Commerson) CUVIER and VALENCIENNES, Histoire naturelle des poissons, vol. 2, p. 176, 1828. [Type, *Centropomus ambassis* Lacepède (*A. commersoni* Cuvier and Valenciennes=*Sciaena safgha* Forskål).]

AMBASSIS LAFA Jordan and Seale

Ambassis lafa JORDAN and SEALE, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 253, fig. 46, 1906.

115007, Tutuila Island, stream at village of Pago Pago, June 2, 1939, 7 specimens.

51818 (type and 32 paratypes, of *Ambassis lafa* Jordan and Seale), Vaisigano River, Apia, Samoa, Jordan and Kellogg.

AMBASSIS VAIVASENSIS Jordan and Seale

Ambassis vaivasensis JORDAN and SEALE, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 254, fig. 47, 1906.

51819 (type and 20 paratypes of *Ambassis vaivasensis* Jordan and Seale), Vaivase River, Apia, Samoa, Jordan and Kellogg.

TABLE 9.—*Counts made on species of* Ambassis *from the Samoan Islands*

Species	Dorsal rays				Anal rays			Pectoral rays
	VII	I	9	10	III	10	11	13
lafa	8	8	4	4	8	7	1	3
vaivasensis	4	4	4		4	4		2

Species	Gill rakers on first gill arch						
	Above angle			Angle	Below angle		
	6	7	8	1	21	22	23
lafa	1	1	1	3		2	1
vaivasensis			2	2	2		

Species	Scales in lateral line						
	Above it			Along lateral line		Below it	
	3	4	5	28	29	5	6
lafa		2	1	1	2	1	2
vaivasensis	2			1	1	2	

Family KUHLIDAE

KEY TO THE SPECIES OF KUHLIA FOUND IN THE PHOENIX AND SAMOAN ISLANDS (see table 10)

1*a*. Scale rows crossing lateral line 40 to 44.

  2*a*. Gill rakers about 7 or 8+1+16 to 18; dorsal rays IX, I, 10 or 11; anal III, 10; scales above lateral line about 6 and below it about 10; about one-fourth of tips of upper and lower lobes of caudal fin whitish and upper and lower margins white; outer middle third of upper and lower caudal lobes with a large black blotch; just beyond tip of lateral line and on middle caudal fin rays is a black spot more evident in young and half grown than large adults; anterior tip of soft dorsal fin white; a light streak occurs at base of soft dorsal, fin otherwise blackish; two or three irregular horizontal rows of brownish blotches across cheeks and operculum________________________ **Kuhlia rupestris** (Lacepède)

  2*b*. Gill rakers about 9 or 10+1+22 to 25; dorsal rays IX, I, 11; anal III, 11 or 12, usually 12; scales above lateral line 5½ or 6 and about 9 below it; caudal fin without large black blotches in upper and lower lobes, the color plain except blackish posterior margin_ **Kuhlia salelea**, new species

1*b*. Scale rows crossing lateral line 50 to 55; gill rakers 8 to 10+1+22 to 28 (young appear to have one or two fewer gill rakers than adults).

  3*a*. Caudal fin without black bars or large black spots, general color plain with posterior margin of fin blackish; outer third of caudal fin with a wide light band, anterior to blackish margin; base of caudal fin rays with silvery area; top of head mottled, especially between eyes, with black and yellow; upper half of body blackish; dorsal fin rays IX, I, 11; and III, 11_______________ **Kuhlia sandvicensis** (Steindachner)

  3*b*. Caudal fin with two to five black bars or spots, areas around and between these spots more or less whitish.

    4*a*. Caudal fin with outer third of upper and lower lobes blackish, this area narrowing into a wide band at tips of midcaudal fin rays; upper and lower sides of caudal fin with a blackish band; whole central portion of each upper and lower lobe of caudal fin has a large blackish spot; these central black areas are bordered by whitish bands posteriorly and sometimes dorsally and ventrally inside the marginal blackish band; sometimes area between central black spots is whitish especially on young and darker in color in adults; tip of chin black; dorsal fin rays IX, I, 11 or 12; anal III, 12_________ **Kuhlia petiti**, new species

    4*b*. Caudal fin with five black bars; a narrow median one; two obliquely converging bars not quite meeting median one posteriorly; a wide black band occupies outer third of each caudal fin lobe, but tips of rays are white, as are areas between all black bars; anterior tip of soft dorsal fin white; otherwise other third is crossed with a black band; anal fin soft rays with black pigment, none on membranes; outer edges of spinous dorsal blackish; tip of chin black; dorsal fin rays IX, I, 9 to 11, A. III, 10 or 11____________ **Kuhlia taeniura** (Cuvier)

Genus KUHLIA Gill

Kuhlia GILL, Proc. Acad. Nat. Sci. Philadelphia, 1861, p. 48. (Type, *Perca ciliata* Cuvier and Valenciennes.)

KUHLIA RUPESTRIS (Lacepède)

Centropomus rupestris Lacepède, Histoire naturelle des poissons, vol. 4, pp. 252, 273, 1802.

114995, Tutuila Island, Pago Pago Bay, submarine light; June 1, 1939, 1 specimen.

114994, Tutuila Island, creek near village at Fagasa Bay, June 5, 1939, 13 specimens.

114993, Tutuila Island, stream at village of Pago Pago, June 2, 1939, 5 specimens.

52426, Apia, Samoa, Jordan and Kellogg, 9 specimens.

109487, Pago Pago, Samoa, W. H. Jones, 18 specimens.

KUHLIA SALELEA, new species

Figure 6

Kuhlia marginata Evermann and Seale, Copeia, No. 119, p. 71, 1923.

Holotype.—A specimen (U.S.N.M. No. 114984) 95 mm. in length from tip of snout to base of caudal fin rays, taken in a small stream on Tutuila Island at the village of Pago Pago, June 2, 1939, by L. P. Schultz, along with 37 paratypes (U.S.N.M. No. 114985).

The following paratypes are in the National Museum: No. 38291, Pago Pago, Samoa, W. H. Jones, 9 specimens; and No. 52276, Apia Samoa, Jordan and Kellogg, 9 specimens.

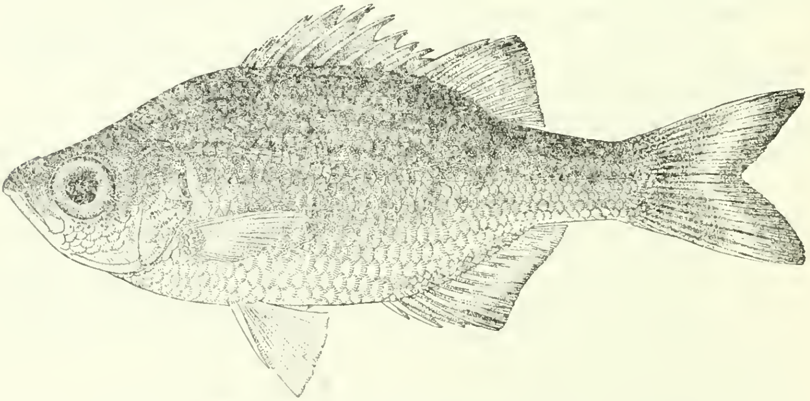

Figure 6.—*Kuhlia salelea*, new species: Holotype (U.S.N.M. No. 114984), 95 mm. in standard length.

Description.—[Measurements and counts of the holotype are given first and detailed measurements and counts of 3 paratypes in parentheses. All measurements are expressed in hundredths of the standard length, length from tip of snout to base of caudal fin rays 95 mm. (87.5, 104.5, and 96 mm)]. Length of head 32.9 (31.4; 31.2; 31.2); greatest depth of body at origin of spiny dorsal 38.4 (38.0; 35.9; 33.8); least depth of caudal peduncle 12.3 (11.9; 12.1; 11.5); length of caudal peduncle or distance from rear edge of base of last anal ray to base of midcaudal fin ray 16.7 (18.8; 17.2; 18.7); width of bony interorbital 9.2 (8.7; 9.4; 9.1); diameter of eye 10.5 (10.9; 9.7; 10.9); length of snout 8.2 (8.1; 8.6; 8.3); length of maxillaries 13.7 (13.0; 13.4; 12.9); postorbital length of head 14.1 (12.6; 13.4; 12.9); length of base of anal fin 25.6 (25.7; 27.2; 26.8) longest gill raker on first gill arch 5.3 (5.7; 6.4; 5.9); anus to origin of anal fin 5.5 (4.2; 5.6; 3.9); distance from tip of snout to the origin of the spinous dorsal 43.2 (41.2; 42.6; 39.9); distance from snout to insertion of pectoral fin 32.2 (29.7; 30.2; 30.9); distance from snout to origin of anal 64.7 (62.4; 63; 59.7); longest rays of dorsal fin—fifth spine 16.8 (–; 17.6; 16.7), first soft ray 18.9 (18.8; 18.6; 18.4); longest rays of anal fin—third spine 12.1 (13.2; 11.7; 12.0) and first soft ray 16.0 (16.4; 15.1; 15.6); longest pectoral fin ray 20.0 (20.0; 18.7; 20.6); longest pelvic fin ray 20.5 (20.4; 18.5; 18.1); longest caudal fin ray 29.8 (29.7; 28.7; 30.4); length of middle caudal fin rays 19.6 (17.7; 18.2; 18.8).

Dorsal fin rays IX, I, 11 (IX, I, 11; IX, I, 11; IX, I, 11); anal III, 11 (III, 12; III, 12; III, 11); pectoral 14 (13; 13; 14); gill rakers on first gill arch 10+1+23 (10+1+24; 11+1+23; 9+1+25); scales 6+42+9 (6+41+9); 6+41+9); 5½+42+9); predorsal scales 10 (10; 10; 10); zigzag row of scales around caudal peduncle 24 (24; 24; 23); rows of scales from base of last anal ray to midbase of caudal fin 9 (9; 8; 10).

The color pattern resembles that of *Kuhlia marginata.* The body is well covered with brown spots along the midsides, these becoming especially prominent on the caudal peduncle where they are arranged in two rows; along the upper back the margin of the scales are brownish, the centers lighter; the upper and lower edges of the caudal fin are white; the posterior margin of the caudal fin is blackish, without the white edging; the soft dorsal, distally is blackish with the tips of the rays whitish; anal similar; tip of lower jaw blackish; branchiostegal membranes often blackish, their margins whitish; peritoneum light-dusky.

Remarks.—This species differs from all other members of the genus *Kuhlia* in combining 23 to 25 gill rakers on the lower gill arch with 41 to 42 scale rows crossing the lateral line. All other species with 38 to 44 scales have fewer than 20 gill rakers on the first gill arch (see Regan's revision of the genus, Proc. Zool. Soc. London, 1913, pp. 374–381).

Salele, the Samoan name of this fish.

KUHLIA SANDVICENSIS (Steindachner)

Moronopsis argenteus var. *sandvicensis* STEINDACHNER, Sitzb. Akad. Wiss. Wien, vol. 74, pt. 1, p. 157, 1876 (1877).

115003, Canton Island lagoon, April 23 to May 13, 1939, 6 specimens.
115006, Hull Island reef, July 12–15, 1939, 17 specimens.
115005, Canton Island channel and lagoon, April 24, 1939, 76 specimens.
115001, Enderbury Island reef, May 15–19, 1939, 27 specimens.

115000, Hull Island channel, July 8–12, 1939, 3 specimens.
115002, Canton Island, reef on ocean side, April 25–28, 1939, 12 specimens.

A study of the above series of specimens, including very small ones up to large adults, and a comparison of these with two paratypes of *Kuhlia bilunulata* Herre, 1935, taken at the Fiji Islands indicate that Herre's *bilunulata* is the same as *K. sandvicensis.*

KUHLIA PETITI, new species

FIGURE 7

Holotype.—A specimen (U.S.N.M. No. 114986) 108 mm. in length from tip of snout to base of caudal fin rays, taken on the reef at Hull Island, July 12 to 15, 1939, by L. P. Schultz, along with 69 paratypes (U.S.N.M. No. 114991).

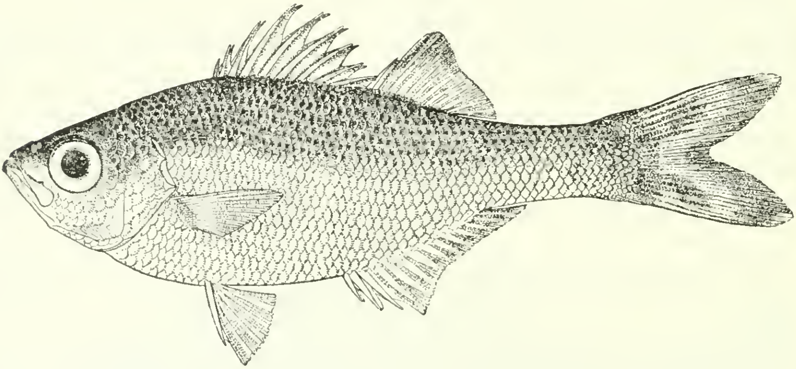

FIGURE 7.—*Kuhlia petiti,* new species: Holotype (U.S.N.M. No. 114986), 108 mm. in standard length.

Additional paratypes were taken as follows: No. 114990, Canton Island channel and lagoon, April 24, 1939, 18 specimens; No. 114988, Enderbury Island reef, May 15–19, 1939, 11 specimens; No. 114992, Hull Island channel, July 8–12, 1939, 20 specimens; No. 114989, Canton Island reef on ocean side of rim, April 25–28, 1939, 3 specimens; No. 114987, Canton Island lagoon, April 23 to May 12, 1939, 2 specimens.

Description.—[Measurements of the holotype are given first and detailed measurements of 6 paratypes in parentheses. All measurements are expressed in hundredths of the standard length, length from tip of snout to base of caudal fin rays 108 mm. (101.5; 113.5; 95; 93; 61; and 116 mm.)]. Length of head 28.3 (30.5; 28.2; 28.4; 28.1; 29.0; 27.8); greatest depth of body at origin of spiny dorsal 34.0 (39.5; 35.3; 34.4; 35.6; 33.8; 33.6); least depth of caudal peduncle 11.1 (11.8; 11.5; 11.5; 11.7; 11.5; 11.2); length of caudal peduncle 23.0 (21.2; 24.3; 24.0; 23.6; 22.6; 23.3); width of bony interorbital 8.5 (9.4; 8.8; 8.4; 9.6; 9.0; 8.6); diameter of eye 9.2 (9.7; 8.8; 9.5; 9.7; 9.7; 9.4; length of snout 7.2 (7.6; 7.1; 7.1; 7.5; 7.0; 6.9); length of maxillaries 10.5 (11.4; 10.6; 10.5; 10.4; 11.3; 10.3); postorbital length of head 11.9

(—; 11.8; 11.7; 12.0; 12.3; 11.5); length of base of anal fin 25.4 (26.2; 27.4; 26.4; 26.4; 24.6; 28.2); longest gill raker on first gill arch 5.3 (4.4; 5.2; 5.3; 4.3; 5.7; 5.2); anus to origin of anal fin 5.8 (—; 5.5; 5.7; 5.1; 4.8; 5.2); distance from tip of snout to the origin of the spinous dorsal fin 36.7 (37.5) 36.2; 36.9; 38.3; 35.9; 36.2); distance from snout to insertion of pectoral fin 27.8 (27.3; 28.8; 29.2; 30.1; 30.3; 28.6); distance from snout to origin of anal fin 57.9 (58; 58.5; 60.0; 58.3; 57.3; 57.3); longest rays of dorsal fin—fifth spine 15.8 (15.8; 17.2; 15.8; 15.7; 16.1; 15.5); first soft ray 15.7 (14.8; 13.6; 14.7; 15.9; 16.4; 14.9); longest rays of anal fin—third spine 10.4 (10.7; 11.5; 12.1; 11.2; 10.8; 9.7); first soft ray 12.5 (14.3; 14.8; 14.9; 12.9; 14.2; 11.2); longest pectoral fin ray 18.5 (20.7; 17.8; 18.9; 19.9; 19.7; 18.5); longest pelvic fin ray 14.8 (15.2; 14.8; 14.8; 13.9; 13.9; 13.8); longest caudal fin ray 29.3 (32.4; 29.5; 29.5; 30.1; 31.1; 30.2); length of middle caudal fin rays 15.7 (16.7; 13.2; 20.7; 16.7; 15.9; 15.3).

Dorsal fin rays IX, I, 12 (IX, I, 11; IX, I, 12; IX, I, 12; IX, I, 11; IX, I, 11; IX, I, 11); anal III, 12 (all III, 12); pectoral 14, 15; 14; 14; 14; 14; 14); gill rakers on first gill arch 9+1+25 (10+1+23; 10+1+25; 8+1+23; 10+1+24; 8+1+23; 8+1+24); scales 6+53+10; (6+54+10; 7+54+11; 6+52+10; 6+53+10; 6+53+10; 6+53+10); predorsal scales 12 (12; 14; 12; 13; 12; 12); zig-zag row of scales around caudal peduncle 24 (all 24); rows of scales from base of last anal ray to midbase of caudal fin 12 (13; 12; 12; 12; 12; 12).

The top of the head is blackish, not mottled as in *K. sandvicensis;* the back and upper sides blackish; tip of lower jaw blackish; the inside of mouth anteriorly, tongue, and lower jaw with black pigment; several black pigment cells on soft rays of anal and soft dorsal; peritoneum blackish or heavily pigmented; inside of opercular apparatus dusky; caudal fin with outer third of upper and lower lobes blackish, this area narrowing into a wide band at tips of midcaudal fin rays; upper and lower sides of caudal fin with blackish band; the whole central portion of each lobe of the caudal fin with a wide blackish area, and bordering these is a white band posteriorly, and sometimes dorsally and ventrally; the young have the tips of each lobe blackish at 20 to 25 mm. standard length, and at 50 mm. the blackish central areas are developed but the midaxis of the fin is whitish, in some adults the central black blotches may almost meet at the midaxis of the caudal fin.

Remarks.—This species differs from all other members of the genus *Kuhlia* in having a black central area in each lobe of the caudal fin and a wide black margin posteriorly on the caudal fin, the regions bordering these areas being whitish.

Named in honor of Arthur Petit, pharmacist's mate, U. S. N., who helped me collect fishes on Canton and Enderbury Islands and assisted me in many other ways.

KUHLIA TAENIURA (Cuvier)

Dules taeniura Cuvier, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 3, p. 85, 1829.

114996, Tutuila Island reef at Alofau, June 3, 1939, 1 specimen.
114997, Rose Island lagoon, June 12 to 20, 1939, 2 specimens.
114998, Tau Island, reef at Siulagi Point, June 27, 1939, 42 specimens.
114999, Tutuila Island, rock pools Fagasa Bay, June 5, 1939, 42 specimens.
52444, Apia, Samoa, Jordan and Kellogg, 4 specimens.

Table 10.—*Counts made on the species of* Kuhlia

Species and locality	Dorsal rays					Anal rays					Pectoral rays		
	IX	I	10	11	12	III	10	11	12	13	13	14	15
rupestris, Tutuila Island	3	3	1	2	----	3	3	----	----	----	----	1	----
salelca, Tutuila Island	8	8	----	8	----	8	----	2	5	1	2	3	----
salelea, Apia	2	2	----	2	----	2	----	1	1	----	----	----	----
sandvicensis, Phoenix Islands	4	4	----	4	----	4	----	4	----	----	1	2	1
petiti, Phoenix Islands	10	10	----	6	4	10	----	----	10	----	----	9	1
taeniura, Samoan Islands	4	4	4	----	----	4	----	4	----	----	----	2	----

Species and locality	Gill rakers on first gill arch																			
	Above angle					At angle	Below angle													
	7	8	9	10	11	1	15	16	17	18	19	20	21	22	23	24	25	26	27	28
rupestris, Tutuila Island	1	1	---	---	---	2	---	1	1	---	---	---	---	---	---	---	---	---	---	---
satelea, Tutuila Island	---	1	3	3	1	8	---	---	---	---	---	---	---	---	5	1	2	---	---	---
salelea, Apia	---	---	2	---	---	2	---	---	---	---	---	---	---	---	---	1	1	---	---	---
sandvicensis, Phoenix Islands	---	---	---	5	---	5	---	---	---	---	---	---	---	---	---	---	2	---	2	1
pctiti, Phoenix Islands	---	3	4	3	---	10	---	---	---	---	---	---	---	---	4	2	4	---	---	---
taeniura, Samoan Islands	---	---	2	1	---	3	---	---	---	---	---	---	---	---	---	1	1	1	---	---

Species and locality	Number of scales								
	In zigzag row around caudal peduncle			Behind base of anal fin					
	23	24	25	8	9	10	11	12	13
salelea, Tutuila Island	1	3	------	1	2	2	------	------	------
petiti, Phoenix Islands	------	9	1	------	------	------	------	8	2

Species and locality	Number of scale rows on side of body														
	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
rupestris, Tutuila Island	----	----	1	----	----	----	----	----	----	----	----	----	----	----	----
salelea, Tutuila Island	----	3	2	----	----	----	----	----	----	----	----	----	----	----	----
salelea, Apia	----	----	1	----	----	----	----	----	----	----	----	----	----	----	----
sandvicensis, Phoenix Islands	----	----	----	----	----	----	----	----	----	----	----	3	----	----	----
petiti, Phoenix Islands	----	----	----	----	----	----	----	----	----	----	----	1	2	4	3
taeniura, Samoan Islands	----	----	----	----	----	----	----	----	----	----	----	1	2	----	----

Family SERRANIDAE

My material of this family from the Phoenix and Samoan Islands does not include enough of the species reported from the Polynesian area to justify the construction of a key to the various species (see table 11).

Genus EPINEPHELUS Bloch

Epinephelus Bloch, Naturgeschichte der ausländischen Fische, vol. 7, p. 11, 1793. [Type, *Epinephelus marginalis* Bloch (="*Perca fasciata* Forskål, by general consent").]

EPINEPHELUS URODELOPS, new species

Figure 8

Holotype.—The only specimen known (U.S.N.M. No. 115366), 85 mm. in standard length, taken by L. P. Schultz on May 25–26, 1939, in the lagoon of Canton Island.

Description.—(Based on the holotype. All measurements are expressed in hundredths of the standard length.) Length of head 41.8; greatest depth of body 37.4; length of snout 9.9; diameter of eye 9.2; length from tip of snout to rear edge of maxillary 21.2; postorbital part of head 24.3; least depth of caudal peduncle 15.3; length of caudal peduncle measured from rear base of anal fin to mid-base of caudal fin 18.5; distance from snout to origin of dorsal fin 42.8; distance from snout to origin of anal fin 70.0; distance from snout to center of anus 64.8; interorbital space 6.2; length of pectoral fin (base of fin to tip of longest ray) 28.0; length of caudal fin 24.7; length of pelvic fins 20.5; second anal spine 17.6; dorsal rays XI, 8; anal III, 8; pectoral rays left 16, right 17; pelvics I, 5; gill rakers on first gill arch 8+1+15; scales in row from base of first dorsal soft ray to lateral line 8, and number of scales from base of first anal spine to lateral line total 21; scale rows crossing lateral line from upper edge of gill opening to base of caudal fin 79.

The third dorsal spine, as are all that follow, about two-thirds length of soft dorsal rays; second anal spine strongest, a little longer than the third; lower opercular spine a little closer to the middle one than the upper is to the middle spine; lateral line extending upward, its highest (dorsal) point is under base of seventh dorsal spine, thence it continues in an almost straight line to midaxis of body just below posterior end of base of soft dorsal, continuing along midline of caudal peduncle and outward on base of caudal fin for a distance equal to two-thirds diameter of eye; teeth depressible on lower jaw, and arranged in several series at front of jaw but posteriorly in only one or two irregular rows, the inner teeth canines; at each side of tip of lower jaw is a strong, nondepressible canine tooth; at each side of the tip of the upper jaw are one or two strong, nondepressible canines, behind these are patches of long brushlike teeth that are depressible; sides of upper jaw with a band of villiform teeth, the outer row of which are small canines, nondepressible; teeth on vomer and palatines; maxillary probably with some scales, though these are not much developed.

Color in alcohol: Head and upper half of body brown, especially anteriorly; posteriorly the lower half of body is pale with faint reticulations; anteriorly the lower half of body and head is spotted with pale round blotches, the largest a little smaller than the pupil; these pale spots occur from below the eye forward to tip of snout, on lower jaw, isthmus, and on base of pectorals and breast; behind the pectoral and pelvic bases the pale spots join to form a reticulated pattern fading in plain pale about over anus; the most characteristic color mark is a black blotch on the upper surface of the caudal peduncle surrounded by a pale ring, directly behind this black blotch is a small black spot also surrounded by pale color; the caudal fin has an oblique dark bar across the rays posteriorly and a fainter one ventrally; the margin of the soft anal rays is blackish then submarginally a pale band, bordered basally by some diffuse brownish pigment, the rest of the fin has a diffuse reticulated pattern.

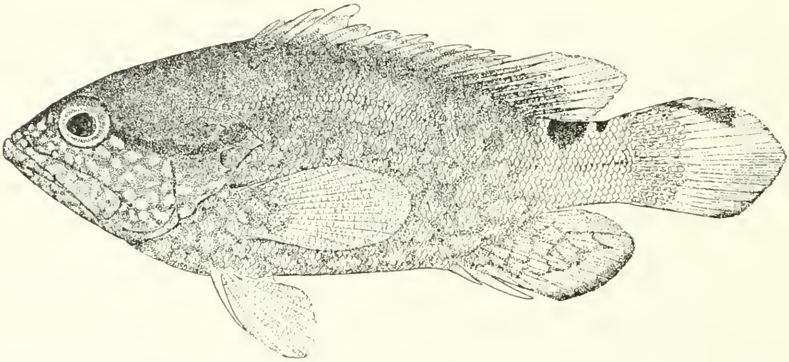

FIGURE 8.—*Epinephelus urodelops,* new species: Holotype (U.S.N.M. No. 115366), 85 mm. in standard length.

Remarks.—This species resembles very closely in color *Cephalopholis urodelus* but differs from it and all other species of serranids in the fewer number of soft dorsal rays, 8 instead of 10 or more.

Named *urodelops* in reference to the general appearance of the color pattern of *Cephalopholis urodelus.*

EPINEPHELUS MERRA Bloch

Epinephelus merra BLOCH, Naturgeschichte ausländischen Fische, vol. 7, pt. 10, p. 17, pl. 329?, 1793.

115384, Tutuila Island, reef at Alofau, June 3, 1939, 3 specimens.
115371, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 1 specimen.
115385, Tutuila Island, Fagasa Bay, rock pools, June 5, 1939, 6 specimens.
115372, Enderbury Island, reef, May 15 to 19, 1939, 6 specimens.
115373, Hull Island, reef, July 12–15, 1939, 13 specimens.

115377, Rose Island, reef, June 11 to 14, 1939, 49 specimens.
115374, Canton Island, reef at ocean, April 25 to 28, 1939, 5 specimens.
115376, Hull Island, channel, July 8–12, 1939, 22 specimens.
115370, Tau Island, reef at Siulagi Point, June 27, 1939, 23 specimens.
115375, Swains Island, reef, May 3 to 9, 1939, 34 specimens.
52379, Apia, Samoa, Jordan and Kellogg, 2 specimens.
83470, Samoa, Wilkes Exploring Expedition, 1 specimen.

Among the specimens listed above are to be found two color patterns, one with a pale pectoral distally and a reticulated color pattern basally, along with white spots helping to make up the pale areas or lines around the hexagonal blackish or brownish spots; the second color pattern, with some specimens intergrading from the first to the second color pattern, has a black or brown spotted pectoral, and the hexagonal color pattern is replaced by brownish blotches ventrally; on many specimens the hexagonal color pattern is replaced by the brownish blotches or spots on head, body, and fins. The specimens that I am referring to *Epinephelus merra* resemble closely figures A and B, plate 7, in Günther's "Fische der Südsee," *Serranus hexagonatus.* Other specimens similar to those listed above, but a distinct form, are discussed under the next species, *E. hexagonatus.*

EPINEPHELUS HEXAGONATUS (Bloch)

Holocentrus hexagonatus Bloch, in Schneider, Systema ichthyologiae, p. 323, 1801.

115383, Hull Island, channel, July 7–17, 1939, 5 specimens.
115380, Tutuila Island, reef at Alofau, June 3, 1939, 38 specimens.
115386, Tutuila Island, reef at Pagai, June 4, 1939, 21 specimens.
115382, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 4 specimens.
115379, Canton Island, lagoon, April 23 to May 12, 1939, 7 specimens.
115381, Canton Island, lagoon, May 23 to 26, 1939, 4 specimens.
115378, Hull Island, channel, July 8–12, 1939, 6 specimens.
52445, Apia, Samoa, Jordan and Kellogg, 10 specimens.

The specimens listed above differ from those called *E. merra* in having two or three rows of teeth on the sides of the mandible instead of several rows; the pectoral is somewhat pointed instead of broadly rounded; the pectoral and caudal are never white-edged posteriorly on *hexagonatus* as in *merra;* the hexagonal spots join on the sides to form blocks of blackish or brownish areas in this species, but in *merra* each hexagonal spot is separated by a pale network of lines; no black blotches occur along the base of the dorsal, although certain hexagonal blotches are darkened to form four or five bars across the body. In general, plate 301, figure 2, *Epinephelus hexagonatus*, in Bleeker's Atlas is a fair picture of the color pattern, but the pectoral is not so pointed in this figure as in my specimens; the black blotches also occur on the dorsal part of the eye, and these are not shown by Bleeker.

EPINEPHELUS CORALLICOLA (Cuvier)

Serranus corallicola Cuvier, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 2, p. 336, 1828.

52227, Apia, Samoa, Jordan and Kellogg, 1 specimen.
83472, Samoa, Wilkes Exploring Expedition, 1 specimen

EPINEPHELUS SOCIALIS (Günther)

Serranus socialis Günther, Journ. Mus. Godeffroy, vol. 1, pt. 1, p. 7, pl. 8, fig. B, 1873.

115348, Rose Island reef, June 11 to 14, 1939, 2 specimens.
115349, Tau Island, reef at Siulagi Point, June 27, 1939, 1 specimen.
115347, Canton Island, reef at ocean, April 25 to 28, 1939, 3 specimens.
115344, Enderbury Island, reef, May 15 to 19, 1939, 1 specimen.
115343, Hull Island, channel, July 8 to 12, 1939, 4 specimens.
115346, Hull Island, reef, July 12 to 15, 1939, 2 specimens.
115345, Swains Island, reef, May 3 to 9, 1939, 9 specimens.

EPINEPHELUS FUSCOGUTTATUS (Forskål)

Perca summana fusco-guttata Forskål, Descriptiones animalium, pp. 11, 42, 1775.

115342, Hull Island, channel, July 7 and 8, 1939, 1 specimen.
115368, Canton Island, lagoon, April 23 to May 12, 1939, 1 specimen.
115367, Canton Island, lagoon, May 23 to 25, 1939, 4 specimens.
52477, Apia, Samoa, Jordan and Kellogg, 1 specimen.

Genus CEPHALOPHOLIS Bloch

Cephalopholis Bloch, *in* Schneider, Systema ichthyologiae . . ., p. 311, 1801. (Type, *Cephalopholis argus* Bloch, *in* Schneider.)

CEPHALOPHOLIS ARGUS (Bloch)

Cephalopholis argus Bloch, *in* Schneider, Systema ichthyologiae . . ., p. 311, pl. 61, 1801.

115351, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 2 specimens.

115359, Hull Island, channel, July 8 to 12, 1939, 5 specimens.
115360, Hull Island, channel, July 7 to 17, 1939, 1 specimen.
115358, Tutuila Island, Fagasa Bay, rock pools, June 5, 1939, 5 specimens.
115353, Rose Island, reef, June 11 to 14, 1939, 16 specimens.
115356, Swains Island, reef, May 3 to 9, 1939, 20 specimens.
115354, Tau Island, reef at Siulagi, June 27, 1939, 3 specimens.
115355, Hull Island, reef, July 12–15, 1939, 3 specimens.
115361, Canton Island, reef on ocean side, April 25 to 28, 1939, 4 specimens.
115362, Rose Island, lagoon, June 12 to 20, 1939, 2 specimens.

115363, Canton Island, reef of the widest shallow channel, May 13, 1939, 3 specimens.

115352, Canton Island, lagoon, April 23 to May 12, 1939, 1 specimen.

115350, Canton Island, off reef in ocean, April 26, 1939, Capt. J. N. Lewis, U. S. N., 1 specimen.

115357, Tutuila Island, reef at Alofau, June 3, 1939, 1 specimen.

CEPHALOPHOLIS LEOPARDUS (Lacepède)

Labrus leopardus Lacepède, Histoire naturelle des poissons, vol. 3, pp. 450, 518, pl. 30, fig. 1, 1802.

52433, Apia, Samoa, Jordan and Kellogg, 2 specimens.

CEPHALOPHOLIS URODELUS (Bloch)

Percam urodetam (Forster) Bloch, *in* Schneider, Systema ichthyologiae . . ., p. 333, 1801 (=*Serranus urodelus* Cuvier and Valenciennes).

115365, Rose Island, lagoon, June 12 to 20, 1939, 5 specimens.
115364, Canton Island, lagoon, May 23–25, 1939, 3 specimens.
52387, Apia, Samoa, Jordan and Kellogg, 3 specimens.

CEPHALOPHOLIS species?

116177, Swains Island, reef, May 3–9, 1939, 2 specimens, 22 and 23 mm. in standard length.

Genus PARACANTHISTIUS Bleeker

Paracanthistius Bleeker, Verh. Akad. Wet. Amsterdam, vol. 14, p. 13, 1874. (Type, *Holocentrus leopardus* Lacepède.)

PARACANTHISTIUS MACULATUS (Bloch)

Bodianus maculatus Bloch, Naturgeschichte der ausländischen Fische, vol. 4, p. 48. pl. 228, 1790.

115341, Canton Island, off reef, April 24, 1939, caught by Capt. J. N. Lewis, U.S.N., and Dr. H. D. Hubbard, U.S.N.
52425, Apia, Samoa, Jordan and Kellogg, 1 specimen.

Genus ANYPERODON Günther

Anyperodon Günther, Catalogue of the fishes of the British Museum, vol. 1, p. 95, 1859. [Type, *Serranus leucogrammicus* Valenciennes (= *Anhyperodon* Boulenger).]

ANYPERODON LEUCOGRAMMICUS (Cuvier)

Serranus leucogrammicus Cuvier, in Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 2, p. 347, 1828.

115369, Canton Island, lagoon, May 23-25, 1939, 1 specimen.
52418, Apia, Samoa, Jordan and Kellogg, 4 specimens.

Genus VARIOLA Swainson

Variola Swainson, Lardner's Cabinet Cyclopaedia (The natural history and classification of fishes), vol. 2, p. 202, 1839. (Type, *Variola longipinna* Swainson.)

VARIOLA LOUTI (Forskål)

Perca louti Forskål, Descriptiones animalium, pp. xi, 40, 1775.

52491, Apia, Samoa, Jordan and Kellog, 2 specimens.
52302, Apia, Samoa, Jordan and Kellogg, 1 specimen.

TABLE 11.—*Counts made on certain species of* Epinephelus *and* Cephalopholis

Species	Number of fin rays													Number of gill rakers on first gill arch								
	Dorsal							Anal			Pectoral			Above				An-gle	Below			
	Spines			Soft				Spines	Soft		16	17	18	6	7	8	9	1	14	15	16	17
	IX	X	XI	14	15	16	17	III	8	9												
E. merra	---	---	6	1	3	2	---	4	4	---	---	1	2	---	---	1	---	1	---	---	1	---
E. hexagonatus	---	---	4	---	1	3	---	3	3	---	1	1	1	1	---	1	---	2	---	2	---	---
E. fuscoguttatus	---	---	2	---	2	---	---	2	2	---	---	2	---	---	---	1	1	2	1	1	---	---
E. socialis	---	---	4	---	4	---	---	4	4	---	---	---	3	---	---	1	---	1	---	---	---	1
E. corallicola	---	---	2	---	1	---	1	2	2	---	---	---	---	---	---	---	---	---	---	---	---	---
C. argus	9	---	---	---	1	8	---	8	---	8	2	1	---	---	---	---	3	3	---	---	2	1
C. urodelus	10	---	---	10	---	---	---	10	---	10	2	1	---	---	---	3	---	3	1	2	---	---
C. leopardus	2	---	---	---	2	---	---	2	---	2	1	1	---	---	---	1	---	1	---	1	---	---

Species	Number of scale rows from upper edge of gill opening to base of caudal fin rays																									
	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107
E. merra	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	1	1	---	---	---	---	---	---	---	---
E. hexagonatus	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	2
E. fuscoguttatus	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	1	---	---	---	---	---	---	---	---	---	---
E. socialis	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	1	---	---
E. corallicola	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
C. argus	---	---	---	---	---	---	---	---	---	---	2	1	---	---	---	---	1	---	---	---	---	---	---	1	---	---
C. urodelus	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
C. leopardus	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	1	---	---	---	---	---	---	---	---

Genus GRAMMISTES Bloch

Grammistes BLOCH, *in* Schneider, Systema ichthyologiae . . . p. 182, 1801. (Type, *Perca sexlineata* Thunberg.)

GRAMMISTES SEXLINEATUS (Thunberg)

Perca sexlineata THUNBERG, Vet.-Akad. Handl., Stockholm, vol. 13, p. 142, pl. 5, 1792.

114982, Tau Island, reef at Siulagi Point, June 27, 1939, 10 specimens.
114983, Swains Island, reef, May 3–9, 1939, 2 specimens.
114981, Rose Island, reef, June 11–14, 1939, 3 specimens.
52392, Apia, Samoa, Jordan and Kellogg, 1 specimen.

One of the Rose Island specimens, 12 mm. in standard length, has four round white spots in a row on upper sides and four more such spots on lower sides; a large white area occurs on the cheek. The fin rays are D. VI to VIII, –I, 12 to 14, anal II, 9 or 10. The anal spines can be found by dissection.

Family PSEUDOCHROMIDAE

KEY TO THE SPECIES OF PSEUDOCHROMIDS FROM THE PHOENIX AND SAMOAN ISLANDS REPRESENTED BY SPECIMENS IN THE NATIONAL MUSEUM

1*a*. Dorsal with pungent spines.

2*a*. Dorsal spines VII to XII.

3*a*. Dorsal spines XI or XII, membranes deeply incised; soft dorsal rays 7, anal rays III, 8; pectoral about 20 to 22; scales about 27; pelvic fins very long, rays I, 5________________**Plesiops nigricans** (Rüppell)[11]

3*b*. Dorsal spines VII, membranes not deeply incised.

4*a*. No dermal flap located on dorsal edge of eye.

5*a*. No pair of pores next to eyes on interorbital space; dorsal rays VII, 23 or 24; anal rays III, 19 or 20; scale rows from where lateral line begins at upper edge of opercular apparatus to base of caudal fin 59 to 62; two lateral lines, dorsal one interrupted under soft dorsal, recommencing a little anteriorly on middorsal line of caudal peduncle; a few canine teeth at front of upper jaw; spine on preopercle short, with a slight curve dorsally; length of pectoral fin about 5 times in standard length.

Aporops bilinearis, new genus and species

5*b*. A pair of large pores next to eyes on interorbital space; dorsal rays VII, 19 to 21; anal III, 16 to 18; scales 48 to 51; one lateral line extending from head along dorsal contour of body, ending under middle third of soft dorsal fin and not recommencing on midline of caudal peduncle; preopercle with a short spine that points slightly downward (ventrally); pectoral fin about 4 times in standard length.

Pseudogramma[12] **polyacanthus** (Bleeker)

4*b*. A dermal flap located dorsally on each eye; a pair of large pores next to eye on interorbital space; anterior canine teeth in jaws; dorsal rays VII, 15 to 24; anal III, 12 to 20; scales 48 to 55.

Rhegma Gilbert[13]

2*b*. Dorsal spines III, a black spot bordered above with white, located posteriorly on caudal peduncle above lateral line.

Pseudochromis jamesi, new species

1*b*. Dorsal without stiff spines, all rays flexible and articulated; pelvic rays long, slender, I, 3; anal with all rays flexible, no stiff spines; scales about 26 or 27; a pair of pores in interorbital space; no lateral line.

Pseudoplesiops rosae, new species

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[11] *Pseudochromichthys* Schmidt, Trans. Pacific Comm. Acad. Sci. U. S. S. R., vol. 2, p. 180, 1931 (genotype, *Pseudochromichthys riukianus* Schmidt), is the same as *Plesiops* Oken, and *P. riukianus* appears to be the same species as *Pharopteryx nigricans* Rüppell.

[12] *Rhegma guineensis* Norman (Discovery Reports, vol. 12, p. 10, fig. 2, 1935) should be placed in the genus *Pseudogramma* along with *Rhegma brederi* Hildebrand, *in* Longley and Hildebrand (Pap. Tortugas Lab., vol. 32, p. 244, fig. 11, 1940), because both have the pair of interorbital pores, absent on *Aporops*. These two species also lack a fleshy tentacle over each eye. It is highly doubtful whether *Pseudogramma guineensis* (Norman) has a lateral line along the midaxis of the caudal peduncle.

[13] Two species known (1) *Rhegma thaumasium* Gilbert, from Toboguilla Island, Panama; off Octavia Bay (Colombia), and Gorgona and Secas Islands, and (2) *Caribrhegma gregoryi* Breder, from Glover reef, off British Honduras. Although Myers (Smithsonian Misc. Coll., vol. 91, No. 23, p. 2, 1935) refers *Rhegma* and *Caribrhegma* to the genus *Pseudogramma*. I do not accept this opinion at the present time.

Genus PLESIOPS Oken

Plesiops OKEN, Isis, 1817, App. p. [1182a].

PLESIOPS NIGRICANS (Rüppell)

Pharopteryx nigricans RÜPPELL, Atlas zu der Reise im nördlichen Afrika, Fische, p. 15, pl. 4, fig. 2, 1828.

115391, Tutuila Island, reef at Alofau, June 3, 1939, 12 specimens (longest 121 mm. in standard length, 160 mm. in total length).

115388, Canton Island, reef of wide shallow channel, May 13, 1939, 4 specimens.

115387, Canton Island, reef at ocean, April 25-28, 1939, 1 specimen.

115390, Hull Island, channel, July 8-12, 1939, 5 specimens.

115389, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 2 specimens.

52437, Apia, Samoa, Jordan and Kellogg, 16 specimens.

52408, Apia, Samoa, Jordan and Kellogg, 28 specimens.

APOROPS, new genus

This new genus differs from all other forms of Pseudochromidae with VII dorsal spines in the increased number of soft fin rays, 23 or 24 in the dorsal and 19 or 20 in the anal fin, as well as in several characters presented in the preceding key. Other characters of the genus are those of the new species.

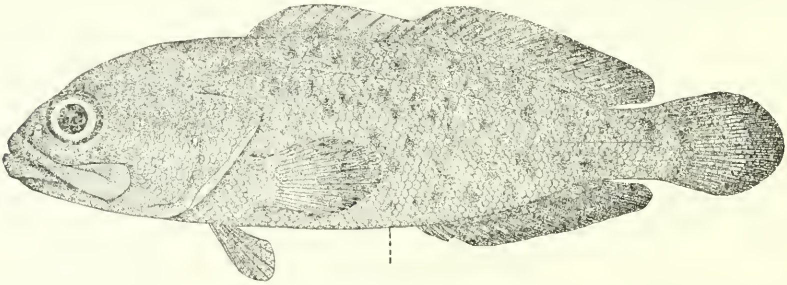

FIGURE 9.—*Aporops bilinearis*, new species: Holotype (U.S.N.M. No. 115336), 51.6 mm. in standard length.

Named *Aporops* in reference to the lack of a large pore in the interorbital next to the eye.

APOROPS BILINEARIS, new species

FIGURE 9

Holotype.—A specimen (U.S.N.M. No. 115336) 51.6 mm. in standard length, taken July 12–15, 1939, by Leonard P. Schultz on the reef at Hull Island.

In addition, the following paratypes were collected: U.S.N.M. No. 115335, from Canton Island lagoon, April 23 to May 12, 1939, 1 specimen, 54.8 mm. (standard length); U.S.N.M. No. 115337, from Canton Island reef, May 13, 1939, 1 specimen, 46.3 mm.; U.S.N.M. No. 115338, from Rose Island reef, June 11–14, 1939, 4 specimens, 315–348 mm.; U.S.N.M. No. 115340, from Swains Island reef, May 3, 1939, 8 specimens, 27–59 mm.; U.S.N.M. No. 115339, from Enderbury Island reef, May 15–19, 1939, 3 specimens. 26.5–60.3 mm.

Description.—(Based on the holotype and 16 paratypes as listed above. Detailed counts and measurements of the holotype are given first, followed by those for six paratypes in parentheses.) Standard length 51.6 mm. (54.8; 60.3; 37.2; 47.7; 59; 46.3); measurements are expressed in hundredths of the standard length respectively. Length of head 36.2 (35.6; 37.5; 36.6; 37.7; 36.8; 35.4); greatest depth of body 27.2 (27.7; 29.0; 28.2; 28.0; 29.8; 27.0); length of snout 6.8 (6.9; 7.1; 6.2; 7.1; 7.0; 6.7); diameter of eye 8.9 (8.0; 7.7; 8.9; 8.8; 8.0; 8.9); distance from tip of snout to posterior edge of maxillary 18.8 (17.5; 17.5; 17.2; 18.8; 18.7; 17.3); distance from tip of snout to origin of dorsal 39 (38.3; 40.5; 40.2; 39.8; 40.2; 38.8); snout to origin of anal fin 63.5 (63.8; 65.0; 60.3; 60.7; 60.4; 60.0); distance from posterior base of anal fin to mid-base of caudal fin 8.9 (12.2; 11.6; 12.1; 12.1; 10.5; 10.8); least depth of caudal peduncle 10.5 (12.0; 12.4; 13.5; 12.1; 11.7; 13.0); length of dorsal lateral line 49.6 (51; 53.0; 51.0; 51.0; 52.7; 45.8); length of lateral line on caudal peduncle 18.3 (28.0; 31.1; 30.2; 17.8; 24.6; 20.9); length of pectoral fin (base to tip of longest ray) 20.2 (21.9; 21.0; 21.5; 23.0; 21.5; 20.5); length of pelvic fin 12.2 (11.5; 12.1; 12.1; 11.7; 12.2; 10.8); length of caudal fin 18.0 (18.3; 19.4; 19.6; 17.6; 17.5; 18.3); length of base of dorsal fin 55.0 (53.0; 56.0; 53.8; 58.9; 56.3; 58.2); length of base of anal fin 28.0 (30.0; 28.2; 34.0; 27.6; 29.9; 29.4).

Dorsal rays VII, 24 (VII, 24; VII, 23; VII, 24; VII, 24; VII, 23; VII, 24); anal rays III, 20 (III, 20; III, 19; III, 20; III, 20; III, 20; III, 20); pectoral rays 17 (16; 15; 16; 16; 16; 16); scale rows from where lateral line begins at upper edge of operculum to base of caudal fin 60 (62; 61; 60; 59; 61; 60; 61); pelvic fin rays always I, 5; gill rakers on first gill arch including the rudiments 5+1+8 (7+1+11; 6+1+10; 6+1+10; 6+1+10; 5+1+9; 6+1+10.

Scales ctenoid, on head and body and partway out on all fins; maxillaries, lower jaw, and snout naked, interorbital with a few scales; teeth villiform in bands on dentary, premaxillaries, vomer, palatines; pectoral and caudal fins rounded; greatest depth near front of spinous dorsal; the short preopercular spine has a slightly outward and upward angle; lateral line begins near anterior dorsal edge of opercle, extending upward at an angle to below the second or third dorsal spine, then flattening out and curving slightly downward and ending under middle third of soft dorsal; lateral line begins again along midaxis of body on caudal region under end of dorsal lateral line or a little in advance of its end; soft dorsal and soft anal rays about twice higher than the spinous portion; gill membranes joined to each other forward over isthmus to form a free fold across isthmus; first nostril tubular, second nostril a pore immediately in front of anterior margin of eye; no large pore next to eye in interorbital space.

Color in alcohol: Brownish with scattered darker spots on body, opercle without a blackish blotch; basal halves of caudal, dorsal, and anal fins brownish, the outer one-third to one-half paler; anterior margin of orbit blackish; chin darker brown than head; the part of the isthmus covered by membranes white.

Named *bilinearis* in reference to the two lateral lines.

Genus PSEUDOGRAMMA Bleeker

Pseudogramma Bleeker, Verh. Akad. Wet. Amsterdam, vol. 15, p. 24, 1875. [Type *Pseudogramma polyacanthus* Bleeker (=*Pseudochromis polyacanthus* Bleeker).]

PSEUDOGRAMMA POLYACANTHUS (Bleeker)

Pseudochromis polyacanthus Bleeker, Nat. Tijdschr. Ned. Ind., vol. 10, p. 375 [reprint, p. 19], 1856.

Pseudogramma polyacanthus [in part] Bleeker, Atlas ichthyologique des Indes Orientales Néerlandaises . . ., vol. 9, pl. 389, fig. 3, 1877.—Günther, Journ. Mus. Godeffroy, vol. 11, p. 159, pl. 98, fig. A., 1876.

Gnathypops samoensis Fowler and Silvester, Carnegie Inst. Washington Publ. No. 312, p. 118, fig. 1, 1922 (type locality: Aua Village, Samoa). Types examined by me at the Academy of Natural Sciences of Philadelphia through the courtesy of H. W. Fowler.

Bleeker's original description of *P. polyacanthus* mentions but a single lateral line, and he gives the soft dorsal rays as 19 to 20 and the anal soft rays 16 or 17, a count that corresponds with three specimens from the Samoan Islands collected by me and several others from the Philippines. However, in Bleeker's later revision of the family Pseudochromidae in 1875, he describes *Pseudogramma polyacanthus* (Bleeker) as having a second lateral line on the caudal peduncle and shows one in his plate 3, figure 2, but again gives the dorsal and anal counts as in 1856.

It seems probable that the first description of Bleeker's was based on a specimen with but a single lateral line and that the later description in 1875 was revised to include the species I have described. The material from the Samoan and Philippine Islands indicates conclusively that the lateral line on the caudal region is lacking on specimens with 19 to 21 dorsal soft rays and 16 to 18 anal soft rays; this same species also has a blackish opercular blotch and a reticulated color pattern as shown by Günther's pl. 98, fig. A, 1876, Bleeker's pl. 3, fig. 2, 1875, and Bleeker's Atlas pl. 389, fig. 3, 1878. Günther's figure and Fowler's figure of *G. samoensis* both lack the lateral line and have the longer pectoral fin, but Bleeker's two figures combine the characters of *P. polyacanthus* and my new species. Thus Bleeker's original description must be considered as fixing the name of *P. polyacanthus*[14] on the species which is described by him and now this description is amended below.

Description based on three specimens. Measurements are expressed in hundredths of the standard lengths, respectively, 36.3; 36.3; 35.7 mm. Length of head 36.4; 35.8; 37.2; greatest depth of body 28.6; 31.4; 25.2; length of snout 5.8; 6.1; 6.2; diameter of eye 8.8; 8.5; 8.4; distance from tip of snout to posterior edge of maxillaries 19.3; 18.2; 17.9; distance from tip of snout to origin of dorsal fin 41.4; 38.3; 38.0; snout to origin of anal fin 60.5; 65; 63; distance from posterior edge of anal fin to midbase of caudal fin 13.5; 11.0; 11.2; least depth of caudal peduncle 12.7; 12.1; 11.2; length of dorsal lateral line 58.6; 55; 57.5; length of pectoral fin (base to tip of longest ray) 25.0; 25.6; 36.0; length of pelvic fin 11; 13; 12.3; length of caudal fin 22; 20.6; 20.8; length of base of dorsal fin 60.5; 49.6; 59; length of base of anal fin 27.5; 29.2; 32.2.

Counts of fin rays, gill rakers, and scales are given in table 12.

115334, Rose Island lagoon, June 12 to 20, 1939, 1 specimen.
115333, Rose Island, reef, June 11–14, 1939, 2 specimens.

TABLE 12.—*Counts made on pseudochromids with VII dorsal spines*

Species	Number of fin rays															
	Dorsal							Anal						Pectoral		
	Spines	Soft rays						Spines	Soft rays							
	VII	19	20	21	22	23	24	III	16	17	18	19	20	15	16	17
Aporops bilinearis	12					3	9	12				3	9	1	5	1
Pseudogramma polyacanthus	7	2	3	2				6	1	4	1					

Species	Number of scale rows from origin of lateral line to base of caudal fin														
	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62
Aporops bilinearis												1	3	3	1
Pseudogramma polyacanthus	2	1		2											

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[14] Since this was first written, Dr. F. P. Koumans kindly examined three of Bleeker's types in Leiden and reports that he "did not find a continuation of the lateral line along the midline of the caudal peduncle." The dorsal soft rays of the types of *P. polyacanthus* number 18, 18, 18; anal 16, 15, 16; scales 45, 45, —; according to Dr. Koumans. Dr. de Beaufort reports that the two specimens collected by the *Siboga* Expedition, 46 and 31 mm. long, have the lateral line developed only anteriorly; the scales number 49 and 51; dorsal rays VII, 20; anal III, 16.

TABLE 12.—*Counts made on pseudochromids with VII dorsal spines*—Continued

Species	Number of gill rakers on first gill arch (including rudiments)							
	Above angle			At angle	Below angle			
	5	6	7	1	8	9	10	11
Aporops bilinearis	2	4	1	7	1	1	4	1
Pseudogramma polyacanthus	1	1		2		1		1

Genus PSEUDOCHROMIS Rüppell

Pseudochromis RÜPPELL, Neue Wirbelthiere zu der Fauna von Abyssinien gehörig, No. 4, p. 8, 1835. (Type, *P. olivaceus* Rüppell.)

PSEUDOCHROMIS JAMESI, new species

FIGURE 10

Holotype.—A specimen (U.S.N.M. No. 115704) 30 mm. in standard length, taken June 11–14, 1939, by Leonard P. Schultz, on the reef of Rose Island, along with two paratypes (U.S.N.M. No. 115705), 31.7 and 31.5 mm., and one (U.S.N.M. No. 115743) from Rose Island lagoon, June 12–20, 1939, 37 mm.

Description.—(Based on the holotype and three paratypes as listed above. Detailed counts and measurements of the holotype are given first, followed by those for the three paratypes in parentheses, respectively, standard length 30 (31.7; 31.5; 37) mm.; measurements are expressed in hundredths of the standard length, respectively.) Length of head 33.3 (31.9; 33.3; 32.3); the greatest depth of body 25.7 (30.6; 27.6; 25.6); length of snout 6.7 (6.6; 7.3; 6.5); postorbital length of head 16.7 (16.4; 17.1; 16.0); diameter of eye 10.3 (11.0; 11.7; 10.3); distance from tip of snout to posterior edge of maxillary 11.0 (10.7; 10.8; 10.5); distance from tip of snout to origin of dorsal fin 34.7 (37.6; 38.0; 35.8); snout to origin of anal fin 63.2 (64.6; 64.0; 65); distance from posterior edge of anal fin to midbase of caudal fin 17.3 (17.4; 17.4; 17.8); least depth of caudal peduncle 15.0 (17.0; 14.9; 14.6); length of pectoral fin (base to tip of longest ray) 21.0 (21.2; 20.0; 20.2); interorbital space 3.3 (4.7; 4.3; 4.1).

Dorsal rays III, 24 (III, 24; III, 24; III, 24); anal rays III, 13 (III, 14; III, 13; III, 14); pectoral rays L. 19, R. 19 (18–19; ?–19; 18); scale rows from upper edge of gill opening to midbase of caudal fin 40 (39; 40; 39); number of pores in dorsal lateral line 32 (29; 32; 29); number of pores in lateral line along midaxis of caudal peduncle 7 (6; 6; 7); about 3 or 4+10 and 4 or 5+10 gill rakers on two of the paratypes; number of scales in a transverse row from origin of anal to base of dorsal fin 13½ (13½; 13½; 13½).

Scales ctenoid on body and head, except the snout, maxillaries, and lower jaw are naked; teeth in lower jaw in a villiform patch near symphysis, with a row of small canines at sides; upper jaw with a few canines at front, behind them some villiform teeth that extend along sides as a narrow band becoming single posteriorly; vomer and palatines with small patches of villiform teeth; first dorsal spine minute, the second about half as long as the third, the third dorsal spine a little longer than snout; first anal spine short, the second about two-thirds of the third, the latter about equal to length of snout; most of the soft dorsal and anal rays appear branched at least near their tips; opercle and preopercle without spines; upper lateral line ends below the sixth or seventh soft ray from rear of dorsal fin; color plain brownish, with an obscure pale streak near midaxis of body extending from behind head and ending over beginning of the second third of anal fin; the most conspicuous color mark is an intense black spot, above lateral line on caudal peduncle just in front of base of caudal fin, bordered by a white (probably orange) spot on dorsal posterior edge of caudal peduncle, and on bases of first few rudimentary caudal rays; fins all plain gray.

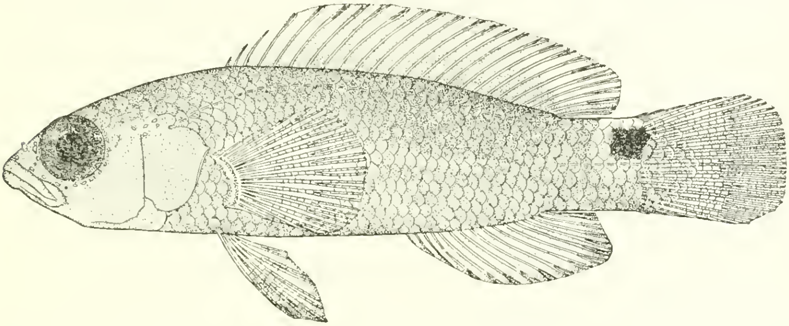

FIGURE 10.—*Pseudochromis jamesi*, new species: Holotype (U.S.N.M. No. 115704), 30 mm. in standard length.

Remarks.—This species may be distinguished from all other species in this genus by the intensely black spot with white dorsally on the posterior upper half of caudal peduncle.

Named *jamesi* after my 12-year-old son, James, who is interested in natural history.

Genus PSEUDOPLESIOPS Bleeker

Pseudoplesiops BLEEKER, Nat. Tijdschr. Ned. Ind., vol. 15, p. 215, 1858. (Type, *Pseudoplesiops typus* Bleeker.)

PSEUDOPLESIOPS ROSAE, new species

FIGURE 11

Holotype.—A specimen (U.S.N.M. No. 116178) 18.7 mm. standard length, taken June 11–14, 1939, on the reef of Rose Island by Leonard

P. Schultz, along with one paratype bearing same data (U.S.N.M. No. 116179).

Description.—(Based on the holotype and paratype, only known specimens. Detailed counts and measurements were made, those for the paratype recorded below in parentheses. All measurements expressed in hundredths of the standard length, 18.7 (20.5) mm.) Length of head 33.6 (32.6); length of snout 6.4 (6.3); diameter of eye 10.6 (11.2); postorbital length of head 18.1 (18.1); greatest depth of body 26.2 (25.8); least depth of caudal peduncle 15.5 (14.1); length of caudal peduncle or distance from base of last anal ray to midbase of caudal fin rays 14.9 (14.1); snout to origin of dorsal fin 38.5 (39.0); snout to origin of anal fin 6.5 (6.1); snout to insertion of pelvic fins 31.6 (30.2); least width of bony interorbital space 4.8 (4.4); length of longest (second soft ray) pelvic ray 32.1 (36.5); length of longest pectoral fin ray 20.3 (20.4); length of longest caudal fin ray 24.8 (26.3); length from tip of snout to posterior edge of maxillary 10.7 (10.2); length of base of dorsal fin 56 (58); length of base of anal fin 25.6 (26.3).

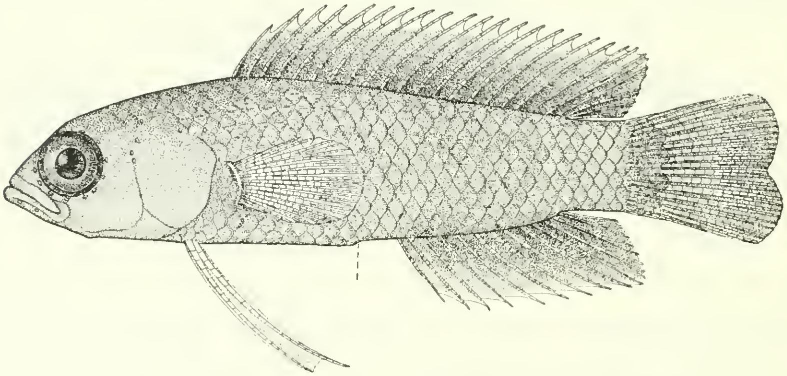

FIGURE 11.—*Pseudoplesiops rosae*, new species; Holotype (U.S.N.M. No. 116178), 18.7 mm. in standard length.

Dorsal rays 22, last four branched (22); anal 13, last four branched (13); pectoral 17 (17); number of scale rows from gill opening to base of caudal fin rays 27 (26); scales in a transverse row obliquely upward and backward from origin of anal fin to dorsal fin 11 (11); scales before dorsal 8 (9).

Scales ctenoid on head and body; lower jaw slightly projecting, mouth a little oblique; scales on cheeks and opercle, snout naked; no teeth on palatines; an enlarged outer series of caninelike teeth on both jaws with a narrow band of villiform teeth inside the outer series on both jaws; a Λ-shaped patch of villiform teeth on vomer; pectoral and caudal fins rounded, pelvics very long and slender, consisting of I, 3 rays, the first two rays long, the third soft ray short and somewhat rudimentary; body and head compressed; the usual opercular spines absent; no lateral line is evident; all the rays of dorsal and anal fins show, under a magnification of 15 times, the articulations found in all soft rays, the first 18 dorsal rays are simple, the next four branched; the first nine anal rays simple the next four branched; the membrane of the first several dorsal rays is deeply incised, it is joined about two-thirds the distance out the next ray; interorbital space with a pair of pores; 11 or 12 pores around margin of orbit; nostrils not tubular; maxillary reaches to under front of pupil; gill membranes free from isthmus, extending far forward with a free fold across isthmus anteriorly.

Color plain brownish on head and body; margins of dorsal and anal fins pale; the basal three-fourths brownish; pelvics, pectorals, and caudal fins pale brownish.

This new species differs from the only other known species in the genus, *Pseudoplesiops typus* Bleeker, as follows:

	P. rosae	*P. typus*[15]
Number of dorsal fin rays	22.	25.
Number of simple rays in dorsal fin	18	16.
Number of anal rays	13	15
Number of simple rays in anal fin	9	7
Pectoral fin rays	17	15 or 16.
Number of scale rows	26 or 27	34
Number of scales in the transverse row	11	15 or 16
Membrane of simple rays of dorsal fin	Deeply incised	Not incised.
Lateral line	Absent	?
Pelvic rays	I, 3	I, 4

Named *rosae* after Rose Island, where this species was collected.

Family PEMPHERIDAE

Genus PEMPHERIS Cuvier

Pempheris Cuvier, Règne animal, ed. 2, vol. 2, p. 195, 1829. (Type, *Pempheris touea* Cuvier.)

KEY TO THE SPECIES OF PEMPHERIS FROM THE PHOENIX AND SAMOAN ISLANDS

1*a*. Base of pectoral with a jet-black spot; front of dorsal including first few rays blackish; tips of first few anal rays not blackish; base of anal fin brownish, sometimes on smaller specimens tips of rays pigmented; upper and lower rays of caudal fin somewhat dusky; head and trunk above blackish or brownish, paler below, sides silvery or with copper colored reflections; snout to origin of dorsal about 1.1 to 1.2 times in greatest depth; length of head about 1.3 times in snout to origin of soft dorsal; dorsal rays VI, 9 or 10; anal III, 39 to 45; pectoral about 17; gill rakers on first gill arch about 8+1+19 to 21; scales 55 to 65.

Pempheris otaitensis Lesson

1*b*. Base of pectoral fin without jet-black spot; front of dorsal not blackish, only outer third of first few dorsal rays black; tips of first few anal rays blackish, this continued along margin of fin as a dusky to black streak, rest of fin pale except base which is brownish; tips of middle rays of caudal fin somewhat pigmented; color of body same as in 1*a*; snout to origin of dorsal about 1.2 in greatest depth; length of head about 1.3 times in snout to origin of soft dorsal; dorsal rays VI, 9; anal III, 39 to 43; scales about 55 to 65; pectoral rays 17 or 18; gill rakers 8 or 9+1+20________________________________ Pempheris mangula Cuvier

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[15] Counts made on Bleeker's pl. 388, fig. 3, Atlas ichthyologique . . ., and data compared with that of Fowler and other authors.

PEMPHERIS OTAITENSIS Lesson

Pempheris otaitensis Lesson, Voyage autour du monde . . . *Coquille*, Zool., vol. 2, pt. 1, p. 167, 1830.

The dentition of the mandible and premaxillary appears to change somewhat at about 165 to 180 mm. standard length. Fishes of the latter lengths have their teeth so enlarged and developed that they can be seen when the mouth is closed each side of the tips of the dentary, the outer teeth pointing outward; those on the upper jaw are similar but less developed. This change in dentition with age causes me to cast doubt on the key by Weber and de Beaufort (Fishes of the Indo-Australian Archipelago, vol. 7, pp. 212–213, 1936) in the separation of *P. oualensis* and *P. otaitensis.* At least the specimens of this type from the Phoenix and Samoan Islands I cannot separate into two species.

115094, Hull Island reef, July 13, 1939, 1 specimen.
115096, Tau Island, reef at Siulagi Point, June 27, 1939, 6 specimens.
115095, Enderbury Island reef, May 15-19, 1939, 2 specimens.
115097, Swains Island reef, May 3-9, 1939, 3 specimens.
52327, Apia, Samoa, Jordan and Kellogg, 4 specimens.

PEMPHERIS MANGULA Cuvier

Pempheris mangula Cuvier, Règne animal, vol. 2, p. 195, 1829 [on *Mangula kutti* Russell, Descriptions and figures of 200 fishes, collected at Vizagaptam on the coast of Coromandel, vol. 2, p. 10, pl. 114, 1803].

52354, Apia, Samoa, Jordan and Kellogg, 2 specimens.
89254, Apia, Samoa, Jordan and Kellogg, 1 specimen.
41563, 41 mm. specimen, badly preserved, identification uncertain, Samoan Islands, 1889, Dr. C. H. White, U. S. N., 1 specimen.

Family LUTIANIDAE

The species and number of specimens available from the Phoenix and Samoan Islands are too few to attempt to make a key to the lutianids that would properly distinguish the various species.

Genus LUTIANUS Bloch

Lutianus Bloch, Naturgeschichte der aüslandischen Fische, vol. 4, p. 105, 1790. (Type, *Lutianus lutianus* Bloch.)

LUTIANUS MONOSTIGMA (Cuvier)

Mesoprion monostigma Cuvier, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 2, p. 446, 1828.

115650, Canton Island, reef at ocean, April 25–28, 1939, 1 specimen.
115649, Tutuila Island, Fagasa Bay, rock rools, June 5, 1939, 1 specimen.

115648, Swains Island, reef, May 3–9, 1939, 3 specimens.
115651, Rose Island reef, June 11–14, 1939, 1 specimen.
52419, Apia, Samoa, Jordan and Kellogg, 4 specimens.

Color in life of the specimen from Rose Island reef. Sides and upper part of head to origin of dorsal pale blue, rest of upper half of body grayish, nearly white ventrally; a small blackish blotch along lateral line below front of soft dorsal fin; all fins pale orange.

LUTIANUS GIBBUS (Forskål)

Sciaena gibba Forskål, Descriptiones animalium, pp. 11, 46, 1775.

115646, Canton Island, off reef, April 27, 1939, Capt. J. N. Lewis, U. S. N., 2 specimens.
115647, Hull Island, channel, July 7–17, 1939, 2 specimens.
52490, Apia, Samoa, Jordan and Kellogg, 6 specimens.

LUTIANUS ARGENTI-MACULATUS (Forskål)

Sciaena argenti-maculata Forskål, Descriptiones animalium, pp. 11, 47, 1775.

52421, Apia, Samoa, Jordan and Kellogg, 2 specimens.
52257, Apia, Samoa, Jordan and Kellogg, 2 specimens.

LUTIANUS VAIGIENSIS (Quoy and Gaimard)

Diacope vaigiensis Quoy and Gaimard, Voyage autour du monde . . . *Uranie*, Zool., p. 307, 1824.

115657, Tutuila Island, reef at Pagai, L. P. Schultz and Frank Taiga, June 4, 1939, 4 specimens.
115653, Tutuila Island, reef at Alofau, June 3, 1939, 2 specimens.
115660, Swains Island, reef, May 3–9, 1939, 4 specimens.
115654, Hull Island channel, July 8–12, 1939, 1 specimen.
115656, Hull Island, channel, July 7–17, 1939, 4 specimens.
115659, Canton Island, reef of widest shallow channel, May 13, 1939, 5 specimens.
115655, Canton Island, reef at ocean, April 25–28, 1939, 3 specimens.
115658, Canton Island, lagoon, May 23–26, 1939, 4 specimens.
52424, Apia, Samoa, Jordan and Kellogg, 9 specimens.
41555, Samoan Islands, 1889, Dr. C. H. White, U. S. N., 1 specimen.
89263, Apia, Samoa, Jordan and Kellogg, 1 specimen.
82952, Samoa, Wilkes Exploring Expedition, 1 specimen.

LUTIANUS KASMIRA (Forskål)

Sciaena kasmira Forskål, Descriptiones animalium, pp. 11, 46, 1775.

115652, Rose Island, lagoon, June 12 to 20, 1939, 5 specimens.
52311, Apia, Samoa, Jordan and Kellogg, 2 specimens.

LUTIANUS BOHAR (Forskål)

Sciaena bohar Forskål, Descriptiones animalium, pp. 11, 46, 1775.

115673, Canton Island, off reef, trolling, April 25, 1939, Capt. J. N. Lewis, 1 specimen, 550 mm. in standard length.
115672, Enderbury Island, reef, channel, May 18, 1939, 1 specimen, 510 mm. in standard length.
52481, Apia, Samoa, Jordan and Kellogg, 1 specimen.

Color in life dark red on sides, nearly blackish red above, paler red on lower sides; dorsals and caudal blackish red; upper rays of pectoral blackish red, lower rays paler red; diffuse blackish band on lower side of maxillaries ending just behind corner of mouth; midsides of head with a broad darker band; a paler area occurs near posterior base of soft dorsal, absent in the larger specimens.

LUTIANUS RIVULATUS (Cuvier)

Diacope rivulata Cuvier, in Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 2, p. 414, pl. 38, 1828.

52382, Pago Pago, Samoa, Jordan and Kellogg, 1 specimen.

Genus LETHRINUS Cuvier

Lethrinus Cuvier, Règne animal, ed. 2, vol. 2, p. 184, 1829. (Type, *Sparus choerohynchus* Bloch, *in* Schneider.)

LETHRINUS RAMAK (Forskål)

Sciaena ramak Forskål, Descriptiones animalium, p. 52, 1775.

115661, Canton Island, lagoon, April 23 to May 12, 1939, 1 specimen.
52439, Apia, Samoa, Jordan and Kellogg, 2 specimens.

LETHRINUS HARAK (Forskål)

Sciaena harak Forskål, Descriptiones animalium, pp. 12, 52, 1775.

52384, Apia, Samoa, Jordan and Kellogg, 4 specimens.
52288, Apia, Samoa, Jordan and Kellogg, 3 specimens.

LETHRINUS MAHSENA (Forskål)

Sciaena mahsena Forskål, Descriptiones animalium, pp. 12, 52, 1775.

34808, Apia, Samoa, May 15, 1883, W. H. Jones, 1 specimen.
52377, Apia, Samoa, Jordan and Kellogg, 1 specimen.

LETHRINUS AMBOINENSIS Bleeker

Lethrinus amboinensis Bleeker, Nat. Tijdschr. Ned. Ind., vol. 6, p. 490, 1854.

52464, Apia, Samoa, Jordan and Kellogg, 1 specimen.

LETHRINUS MINIATUS (Bloch)

Sparus miniatus (Forster) Bloch, *in* Schneider, Systema ichthyologiae . . ., p. 281, 1801.

52420, Apia, Samoa, Jordan and Kellogg, 1 specimen.

Genus MONOTAXIS Bennett

Monotaxis Bennett, Memoir of the life and public services of Sir Stamford Raffles, p. 688, 1830. [Type, *Monotaxis indica* Bennett (*Sciaena grandoculis* Forskål).]

MONOTAXIS GRANDOCULIS (Forskål)

Sciaena grandoculis Forskål, Descriptiones animalium, pp. 12, 53, 1775.

115670, Rose Island, lagoon, June 12 to 20, 1939, 1 specimen.
115671, Rose Island, reef, June 11 to 14, 1939, 2 speciments.
52473, Apia, Samoa, Jordan and Kellogg, 1 specimen.

Genus SCOLOPSIS Cuvier

Scolopsis Cuvier, Mém. Mus. Hist. Nat. Paris, vol. 1, p. 361, 1815. [Type, the *Curite* of Russell (=*Scolopsis curite* Cuvier).]

SCOLOPSIS TRILINEATUS Kner

Scolopsis trilineatus Kner, Sitzb. Akad. Wiss. Wien, vol. 57, pt. 1, pp. 27, 30, pl. 2, fig. 5, 1868.

115662, Tutuila Island, reef at Pagai, L. P. Schultz and Frank Taiga, June 4, 1939, 2 specimens.

52528, Apia, Samoa, Jordan and Kellogg, 4 specimens.

Genus GNATHODENTEX Bleeker

Gnathodentex Bleeker, Versel. Akad. Amsterdam, vol. 7, p. 41, 1873. [Type, *Gnathodentex aureolineatus*=*Pentapus aureolineatus* (Lacepède).]

GNATHODENTEX AUREOLINEATUS (Lacepède)

Sparus aureolineatus Lacepède, Histoire naturelle des poissons, vol. 4, pp. 42, 132, 1802.

115665, Tutuila Island, reef at Pagai, L. P. Schultz and Frank Taiga, June 4, 1939, 28 specimens.

115666, Tutuila Island, reef at Alofau, June 3, 1939, 2 specimens.

115668, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 4 specimens.

115667, Rose Island, lagoon, June 12 to 20, 1939, 4 specimens.

115669, Rose Island, reef, June 12 to 20, 1939, 2 specimens.

52362, Apia, Samoa, Jordan and Kellogg, 4 specimens.

Color in life, from a specimen taken on the reef at the entrance of Pago Pago Bay, all fins pink, margin of pelvic spines blackish; back yellowish with area of light lemon yellow at posterior base of soft dorsal, this area saddle-shaped, and extending downward and forward; sides of body below lateral line with four orange-yellow lines; a fifth pink one very narrow; maxillaries orange; behind the corner of jaw is an orange spot in line with the front margin of eye; lower jaw pinkish; base of pectoral yellow.

Genus APRION Valenciennes

Aprion Valenciennes, in Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 6, p. 544, 1830. (Type, *Aprion virescens* Valenciennes.)

APRION VIRESCENS Valenciennes

Aprion virescens Valenciennes, in Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 6, p. 544, pl. 168, 1830.

115332, Tutuila Island, off Steps Point, July 2, 1939, caught by William Debbs Martin, U.S.N., while trolling, 1 specimen.

Dorsal rays X, 11; anal III, 8; scales, 49 along lateral line; gill rakers on first gill arch 7+1+15.

TABLE 13.—*Counts made on various species of Lutianidae*

Genus and species	Number of scale rows on side of body																																	
	Along upper edge of lateral line																				Along midaxis of body													
	40 41	42 43	44 45	46 47	48 49	50 51	52 53	54 55	56 57	58 59	60 61	62 63	64 65	66 67	68 69	70 71	72 73	74 75	76 77	78 79	80 81	42 43	44 45	46 47	48 49	50 51	52 53	54 55	56 57	58 59	60 61	62 63	64 65	66 67	68 69
Lutianus gibbus															2																		2		
Lutianus argenti-maculalus					1		1																2												
Lutianus monostigma										2	1	1													3										
Lutianus vaigiensis								1	1	1	4	1												6											
Lutianus kasmira																					1														1
Lutianus bohar																2	1											1	1	1					
Lethrinus mahsena				1																			1												
Lethrinus ramak				1	1																			2											
Lethrinus harak				1	1																	1	1												
Lethrinus miniatus						1																			1										
Gnathodentex aureolineatus																1			1																
Monotaxis grandoculis				2																			2												
Scolopsis trilineatus		1																					1												

Genus and species	Number of fin rays															Number of gill rakers on first gill arch																				
	Dorsal										Anal					Above angle						Below angle														
	Spines		Soft rays								Spines	Soft rays																								
	IX	X	8	9	10	11	12	13	14	15	III	7	8	9	10	4	5	6	7	8	9	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Lutianus gibbus		1							1				1								1															1
Lutianus argenti-maculatus		2						1	1		1		1							1								1								
Lutianus monostigma		4						4			4		4					3								1		1	1							
Lutianus raigiensis		6						2	4		5		5				2	3	1									2	4							
Lutianus kasmira		1								1	1		1						1														1			
Lutianus bohar		1						1			1			1																						
Lethrinus mahsena		1		1							1		1				1						1													
Lethrinus ramak	1	1	1	1							2		2				2					1	1													
Lethrinus harak		2		2							2		2				2						2													
Lethrinus miniatus		1		1							1		1				1							1												
Gnathodentex aureolineatus	2	2			4						5		1	3	1	1	1							2												
Monotaxis grandoculis		3		2	1						2			2			2						1	1												
Scolopsis trilineatus	1			1							2	2					1						1													

Family THERAPONIDAE

Genus THERAPON Cuvier

Therapon Cuvier, Règne animal, ed. 1, vol. 2, p. 295, 1817. (Type, *Holocentrus servus* Bloch.)

THERAPON JARBUA (Forskål)

Sciaena jarbua Forskål, Descriptiones animalium, pp. 12, 50, 1775.

115663, Tutuila Island, Cocoanut Point, June 4, 1939, 16 specimens.
115664, Tutuila Island, reef at Alofau, June 3, 1939, 6 specimens.
52342, Apia, Samoa, Jordan and Kellogg, 4 specimens.
41552, Samoan Islands, 1889, C. H. White, 1 specimen.
82954, Samoa, Wilkes Exploring Expedition, 1 specimen.

Family POMADASYIDAE

Genus PLECTORHINCHUS Lacepède

Plectorhinchus Lacepède, Histoire naturelle des poissons, vol. 3, p. 134, 1802. (Type, *Plectorhinchus chaetodonoides* Lacepède.)

PLECTORHINCHUS NIGRUS (Mertens)

Pristipoma nigrum Mertens, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 5, p. 258, 1830.

115738, Tutuila Island, reef at Alofau, June 3, 1939, 1 specimen.
52378, Apia, Samoa, Jordan and Kellogg, 3 specimens.

PLECTORHINCHUS DIAGRAMMUS (Linnaeus)

Perca diagramma Linnaeus, Systema naturae, ed. 10, vol. 1, p. 293, 1758.

52480, Apia, Samoa, Jordan and Kellogg, 1 specimen.

Genus CAESIO Lacepède

Caesio Lacepède, Histoire naturelle des poissons, vol. 3, p. 85, 1802. (Type, *Caesio caerulaureus* Lacepède, designated by Bleeker.)

CAESIO CAERULAUREUS Lacepède

Caesio caerulaureus Lacepède, Histoire naturelle des poissons, vol. 3, pp. 85, 86, 1802.

52469, Apia, Samoa, Jordan and Kellogg, 5 specimens.

Family MULLIDAE

KEY TO THE GENERA AND SPECIES OF MULLIDAE FROM THE PHOENIX AND SAMOAN ISLANDS IN THE NATIONAL MUSEUM

1*a*. Teeth on vomer and palatines; teeth in both jaws in narrow villiform bands anteriorly becoming single posteriorly; soft dorsal and anal fins with scales anteriorly and basally; first dorsal spine very minute; the second long and flexible; dorsal rays VIII–I, 8; anal I, 6 or 7.

2*a*. Peritoneum black; tip of spiny dorsal black, with a fainter and wider cross band across middle of fin; soft dorsal similar to spiny dorsal except black pigment is fainter; upper lobe of caudal with four oblique blackish bands; lower caudal lobe with three such bands, third one toward tip much blacker than any other on entire caudal fin; a yellow streak along sides at level of eye persists for some time after preservation, with traces of two others above it; pelvics and anal yellow; scales about 35 or 36; gill rakers about 8 or 9+1+20 or 21.

Upeneus vittatus (Forskål)

2b. Peritoneum pale; tips of dorsals not black, spiny dorsal between tips of spines on posterior edge of membrane has small pigmented areas; soft dorsal with three or four transverse dark bands; upper lobe of caudal fin with seven oblique blackish bars, lower lobe of caudal with five or six similar bars, last two toward tip of lower lobe much blacker than others; scales about 39; gill rakers about 6+1+14 or 15.

Upeneus arge Jordan and Evermann

1b. No teeth on vomer or palatines; no scales on dorsal or anal fins; dorsal rays VIII–I, 8; anal I, 7.

3a. Teeth near front of each jaw in a narrow villiform band, becoming single posteriorly; first dorsal spine minute, second flexible; peritoneum black; scales 36 to 39.

4a. Snout shorter, 2.2 to 3 in head (2.7 to 3 in young, 2.2 to 2.7 in adults) and 2.1 to 2.5 in greatest depth of body; eye larger 1.2 to 1.5 in snout; maxillaries (tip of snout to rear edge of maxillary) 1.2 to 1.4 in snout; eye 0.9 to 1.1 in interorbital space; greatest depth 3.5 to 4 in standard length; gill rakers 8 or 9+1+20 to 24; color description from Weber and de Beaufort: "Grayish or brownish above, lighter below, a yellow band from eye to caudal, touching lateral line; fins yellowish-hyaline, in life often with red spots on side of head." No black blotch near lateral line above tip of pectoral fin.

Mulloidichthys auriflamma (Forskål)

4b. Snout longer, 2.1 to 2.5 in head (2.3 to 2.5 in young and 2.1 to 2.3 in adults), and 1.7 to 1.95 in greatest depth of body; eye smaller 1.4 to 1.9 in snout; length of maxillaries 1.4 to 1.8 in snout; eye 1 to 1.2 in interorbital space; greatest depth 4 to 4.5 in standard length; gill rakers 8 or 9+1+18 or 19; color description from Weber and de Beaufort: "In life a yellow longitudinal stripe from eye to base of caudal visible in alcoholic specimens as a yellow line, a less distinct one above it and two or three similar ones below it and on cheeks." A blackish blotch, somewhat obscure on some specimens just below lateral line near end of pectoral fin.______________ **Mulloidichthys samoensis** (Günther)

3b. Teeth in both jaws in a single series, conical, rather short, and not very close together.

5a. Second dorsal spine pungent, the tip not flexible.

6a. Barbels equal to length of second dorsal spine; widest expanse of maxillary a little less than diameter of eye; head about 3.2 in standard length; eye about 4 to 4⅓ in head; color pattern consistently with a dark bar under anterior two-thirds of base of first dorsal, then a wide pale interspace followed by a second wide band from under soft dorsal to real half of anal base; upper half of caudal peduncle blackish, separated from second black bar by a paler space; these markings more pronounced in half-grown examples than in adults; gill rakers about 9+1+29, scales about 27.

Parupeneus bifasciatus (Lacepède)

6*b*. Barbels 1½ to 2 times as long as second dorsal spine; widest expanse of maxillary a little greater than diameter of eye; head about 2.9 in standard length; eye about 4½ to 5 in head; color pattern consisting of a pale bar under front of first dorsal; then a second pale bar under rear base of first dorsal, a third pale bar (narrow as first two) at under origin of second dorsal followed by a more intensely darker bar under front of this fin than preceding dark bars between pale bar; fourth pale bar very wide, extending from middle of base of second dorsal well on caudal peduncle and wider ventrally; upper part of caudal peduncle blackish posteriorly; gill rakers about 8+1+28; scales about 30.

Parupeneus trifasciatus (Lacepède)

5*b*. Second dorsal spine flexible, tip not pungent.

7*a*. Length of depressed first dorsal fin much shorter than barbels, contained about 1½ times in length of barbels; length of barbels about 2.8 to 3.1 times in standard length; no black blotch on caudal peduncle, no blackish band along upper sides; anterior part of body dark with a large pale area behind second dorsal extending a little below lateral line; fins all dusky; scales about 28 or 29; gill rakers about 6+1+24; no pale area on middle of upper sides below and between two dorsal fins.

Parupeneus chryserydros (Lacepède)

7*b*. Depressed first dorsal approximately same length as barbels; barbels about 3.8 to 4½ times in standard length; scales about 27 to 31; gill rakers 6 to 8+1+18 to 21.

8*a*. An oblong pale blotch just above lateral line from under middle of first dorsal to under front of second dorsal; a black blotch on caudal peduncle; a black streak from snout through eye but not continuing behind head______ **Parupeneus malabaricus** (Cuvier)

8*b*. No oblong pale blotch on sides of body; usually a dark streak (faint in adults) from snout through eye to upper side of caudal peduncle, lower half of body abruptly paler below this streak and darker above it; caudal peduncle with a blackish blotch.

Parupeneus barberinus (Lacepède)

Genus UPENEUS Cuvier

Upeneus Cuvier, Histoire naturelle des poissons, vol. 3, p. 448, 1829. (Type, *Mullus vittatus* Forskål, designated by Bleeker, 1876.)

UPENEUS VITTATUS (Forskål)

Mullus vittatus Forskål, Descriptiones animalium, pp. 10, 31, 1775.

115684, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 4 specimens.

52200, Apia, Samoa, Jordan and Kellogg, 4 specimens.

UPENEUS ARGE Jordan and Evermann

Upeneus arge Jordan and Evermann, Bull. U. S. Fish Comm., vol. 22 (1902), p. 187, 1903.

115685, Canton Island, lagoon, caught in gill net May 12–13, 1939, 2 specimens, 215 and 260 mm. in standard length. These have been compared with the type of *U. arge* from Honolulu and agree with it in all characters studied. These two specimens extend the range of this species to the Phoenix Islands.

TABLE 14.—*Counts made on two species of* Mulloidichthys

Species	Number of scale rows				Number of gill rakers on first gill arch										
	Crossing lateral line				Upper part of arch			At angle	Lower part of arch						
	36	37	38	39	7	8	9	1	18	19	20	21	22	23	24
auriflamma	1	4	1	1	1	6	2	9	----	----	1	1	1	4	2
samoensis	1	2	1	----	------	8	1	9	2	7	----	----	----	----	----

Genus MULLOIDICHTHYS Whitley

Mulloidichthys WHITLEY, Rec. Australian Mus., vol. 17, p. 122, 1929. [Type, *Mullus flaveolineatus* Lacepède (=*Mulloides* Bleeker, preoccupied by *Mulloides* Richardson).]

MULLOIDICHTHYS AURIFLAMMA (Forskål)

Mullus auriflamma FORSKÅL, Descriptiones animalium, pp. 10, 30, 1775.

115691, Rose Island, reef, June 11–14, 1939, 12 specimens.

115687, Hull Island, channel, July 7–17, 1939, 1 specimen.

115690, Hull Island, reef, July 13, 1939, 1 specimen.

115689, Tutuila Island, reef at Alofau, June 3, 1939, 1 specimen.

115688, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 1 specimen.

115686, Canton Island, lagoon, caught by gill net, May 12–13 1939, 1 specimen.

52388, Apia, Samoa, Jordan and Kellogg, 2 specimens.

56993, Apia, Samoa, Jordan and Kellogg, 1 specimen.

MULLOIDICHTHYS SAMOENSIS (Günther)

Mulloides samoensis GÜNTHER, Journ. Mus. Godeffroy, vols. 2–3, pts. 5–6, p. 57, pl. 43, fig. B, 1874.

115678, Hull Island, channel, July 8–12, 1939, 19 specimens.

115682, Hull Island, channel, July 7–17, 1939, 5 specimens.

115679, Hull Island, reef, July 12–15, 1939, 3 specimens.

115680, Canton Island, lagoon, May 23–25, 1939, 4 specimens.

115675, Canton Island, lagoon, caught with gill net, May 12–13, 1939, 18 specimens.

115677, Canton Island, lagoon, April 23 to May 12, 1939, 7 specimens.

115681, Canton Island, reef at ocean, April 25–28, 1939, 1 specimen.

115674, Swains Island, seine at night on beach, May 4, 1939, 1 specimen.

115676, Tutuila Island, reef at Alofau, June 3, 1939, 5 specimens.

115683, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 2 specimens.

34806, Apia, Samoa, May 15, 1883, Dr. W. H. Jones, 1 specimen.

56999, Apia, Samoa, Jordan and Kellogg, 3 specimens.

52488, Apia, Samoa, Jordan and Kellogg, 5 specimens.

117801, Apia, Samoa, Jordan and Kellogg, 2 specimens.

Genus PARUPENEUS Bleeker

Parupeneus Bleeker, Ned. Tijdschr. Dierk., vol. 1, p. 242, 1863. (Type, *Mullus trifasciatus* Lacepède.)

PARUPENEUS BIFASCIATUS (Lacepède)

Mullus bifasciatus Lacepède, Histoire naturelle des poissons, vol. 3, pp. 383, 404, pl. 14, fig. 2, 1802.

115693, Enderbury Island, reef, May 15–19, 1939, 1 specimen.
115694, Hull Island, channel, July 7–17, 1939, 3 specimens.
115695, Hull Island, reef, July 12–15, 1939, 1 specimen.
115696, Canton Island, reef at ocean, April 25–28, 1939, 1 specimen.
115692, Rose Island, reef, June 11–14, 1939, 17 specimens.
15132, Samoan Islands, A. B. Steinberger, 2 specimens.
52431, Apia, Samoa, Jordan and Kellogg, 4 specimens.

PARUPENEUS TRIFASCIATUS (Lacepède)

Mullus trifasciatus Lacepède, Histoire naturelle des poissons, vol. 3, pp. 383, 404, pl. 15, fig. 1, 1802.

115698, Tutuila Island, reef at Alofau, June 3, 1939, 14 specimens.

115699, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 33 specimens.

115701, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 4 specimens.

115700, Rose Island, reef, June 11–14, 1939, 6 specimens.

115697, Rose Island, lagoon, June 12–20, 1939, 3 specimens.

51737, six types of *Pseudupeneus moana* Jordan and Seale, Samoa, Jordan and Kellogg.

26822, type of *Upeneus velifer*, Johnston Island.

PARUPENEUS CHRYSERYDROS (Lacepède)

Mullus chryserydros Lacepède, Histoire naturelle des poissons, vol. 3, pp. 384, 406, 1802.

115702, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 2 specimens.

52201, Apia, Samoa, Jordan and Kellogg, 1 specimen.

52375, Pago Pago, Samoa, Jordan and Kellogg, 1 specimen.

PARUPENEUS MALABARICUS (Cuvier)

Upeneus malabaricus Cuvier, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 3, p. 467, 1829.

52434, Apia, Samoa, Jordan and Kellogg, 3 specimens.

PARUPENEUS BARBERINUS (Lacepède)

Mullus barberinus Lacepède, Histoire naturelle des poissons, vol. 3, pp. 283, 406, pl. 13, fig. 3, 1802.

52274, Apia, Samoa, Jordan and Kellogg, 2 specimens.

Family CIRRHITIDAE

A KEY TO THE GENERA OF CIRRHITID FISHES LIKELY TO OCCUR IN THE PHOENIX AND SAMOAN ISLANDS

1*a*. That portion of the gill membranes covering isthmus without scales, naked. Scales on cheek large, arranged in 3 to 6 rows.
  2*a*. Snout very long and pointed; scales on cheek in about three rows; palatine teeth absent; pectoral fin formula usually ii+6+v.
    Oxycirrhites Bleeker
  2*b*. Snout normal, not sharply pointed; palatine teeth present or absent; about five or six rows of scales on cheek; pectoral fin formula usually i or ii+5 to 7+v to vii---------------------------- **Amblycirrhitus Gill**
1*b*. Gill membranes over isthmus with fine scales (these are embedded in *Cirrhitus pinnulatus*).
  3*a*. About 4 to 6 rows of scales on cheek; pectoral fin formula i+6 to 8+v to vii.
    4*a*. Palatine teeth absent---------------------------- **Paracirrhites Bleeker**
    4*b*. Palatine teeth present------------------------- **Cirrhitichthys Bleeker**
  3*b*. About 15 to 30 rows of scales on cheek.
    5*a*. About 15 to 20 rows of scales on cheek; palatine teeth present; preopercle with about 11 strong teeth; pectoral fin formula i+7+vi.
      Hughichthys, new genus
    5*b*. About 20 to 30 rows of scales on cheek; palatine teeth absent; preopercle finely serrated with about 35 denticles; pectoral fin formula usually i+6 or 7+vii; scales 38 or 39; dorsal rays X, 10 or 11; anal III, 5 or 6; gill rakers about 7 or 8+11 or 12--------------- **Cirrhitus Lacepède**

Genus OXYCIRRHITES Bleeker

Oxycirrhites Bleeker, Act. Soc. Sci. Indo-Neerl., vol. 2, p. 39, 1857. (Type, *Oxycirrhites typus* Bleeker.)

No specimen in the National Museum from these localities.

Genus AMBLYCIRRHITUS Gill

Amblycirrhitus Gill, Proc. Acad. Nat. Sci. Philadelphia, 1862, p. 105. (Type, *Cirrhitus fasciatus* Cuvier and Valenciennes, preoccupied, replaced by *Amblycirrhitus indicus* Fowler, 1938.)

A KEY TO THE SPECIES REFERRED TO THE GENUS AMBLYCIRRHITUS FROM THE PHOENIX AND SAMOAN ISLANDS

1*a*. Dorsal rays usually X, 11; anal III, 6; rows of scales on cheek usually 6; teeth on posterior edge of preopercle fine about 20 to 30; gill membranes over isthmus naked; gill rakers 4 to 6+1+11.
  2*a*. Pectoral fin formula ii+5+vii; scales 44 to 47; in upper half of body, posteriorly, a pale or white band, pinkish in life; behind eye a pale, black-bordered U-shaped color mark; on interopercle three or four black-bordered pale marks. Following color notes taken on a specimen collected on reef at Rose Atoll: Upper half of body olive-brown interrupted above midaxis posteriorly with a wide band of translucent pinkish orange that ends near base of caudal fin rays; lower half of head and body pastel purplish orange, with a brownish tinge in it on caudal region; caudal fin pale olive-brown, with orange tinge on upper rays; eye orange, with a red oval line behind eye, its outer margin

black bordered, and interrupted posteriorly; three short black-bordered red bars on lower margin of opercle and subopercle; dorsal fin with its basal two thirds orange---------**Amblycirrhitus arcatus** (Cuvier)

2*b*. Pectoral fin formula i+6+vii; scales about 49; color pattern of numerous black spots.

3*a*. Upper half of body with numerous black spots; axis of body with a pale to white band and a few faint brownish spots along its lower border; lower parts of head and body plain.
Amblycirrhitus hemistictus (Günther)

3*b*. Body profusely spotted with black spots arranged in streaks ventrally; no pale band on midsides but a light spot on middle of side along lateral line------------------ **Amblycirrhitus polystictus** (Günther)

1*b*. Dorsal rays X, 14; anal III, 6; rows of scales on cheek about 5; teeth on preopercle strong, about 12 or 13; gill membranes over isthmus naked; pectoral fin formula ii+6+vi; scales 49 to 51; caudal peduncle with a large black ocellated spot; body with pale blotches on a brownish background; head with lengthwise wavy brown lines.
Amblycirrhitus hubbardi, new species

AMBLYCIRRHITUS ARCATUS (Cuvier)

Cirrhites arcatus Cuvier, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 3, p. 74, 1829.

115747, Rose Island, lagoon, June 12–20, 1939, 3 specimens.
115748, Rose Island, reef, June 11–14, 1939, 99 specimens.

AMBLYCIRRHITUS HEMISTICTUS (Günther)

Cirrhites hemistictus Günther, Journ. Mus. Godeffroy, vols. 2–3, pts. 5–6, p. 69, pl. 50, fig. B, 1874.

115752, Enderbury Island, reef, May 15–19, 1939, 1 specimen.
115751, Swains Island, reef, May 3–9, 1939, 1 specimen.

AMBLYCIRRHITUS POLYSTICTUS (Günther)

Cirrhitus polystictus Günther, Journ. Mus. Godeffroy, vols. 2–3, pts. 5–6, p. 70, pl. 50, fig. A, 1874.

———, Swains Island, March 10, 1936, U. S. C. G. *Itasca*.
———, Jarvis Island, 1935, Dr. Dana Coman.

AMBLYCIRRHITUS HUBBARDI, new species

Figure 12

Holotype.—A specimen (U. S. N. M. No. 115750) 35 mm. in standard length, taken May 15–19, 1939, by Leonard P. Schultz on the reef at Enderbury Island, along with two paratypes (U. S. N. M. No. 115749) with the same data.

Description.—(Based on the holotype and two paratypes. Detailed counts and measurements of the holotype are given first, followed by those for two paratypes in parentheses. Measurements are expressed in hundredths of the standard length, 35.0 (36.0; 47.0) mm.) Length of head 38.2 (38.0; 36.2); greatest depth of body 34.2 (33.0; 33.8); length of snout 11.2 (10.6; 10.8); diameter of eye 11.4 (11.1; 10.4);

distance from tip of snout to posterior edge of maxillary 14.6 (13.9; 14.9); distance from tip of snout to origin of dorsal fin 35.4 (33.9; 36.2); snout to origin of anal fin 64.9 (69.1; 66.0); distance from posterior base of anal fin to midbase of caudal fin 23.4 (23.3; 22.8); least depth of caudal peduncle 12.9 (13.1; 13.0); postorbital length of head 19.1 (18.6; 18.5); width of bony interorbital space 4.7 (4.7; 4.3); length of longest ray of pectoral fin 32.8 (33.3; 33.0); length of longest (fourth or fifth) dorsal spine 14.9 (15.3; 14.9); length of longest or first soft ray of dorsal 22.9 (19.5; 19.4); length of caudal fin 25.7 (21.7; 24.4); length of pelvic fin 23.4 (21.7; 23.4); length of longest or second anal spine 16.6 (16.7; 17.4); least width of preorbital 3.7 (3.3; 3.8).

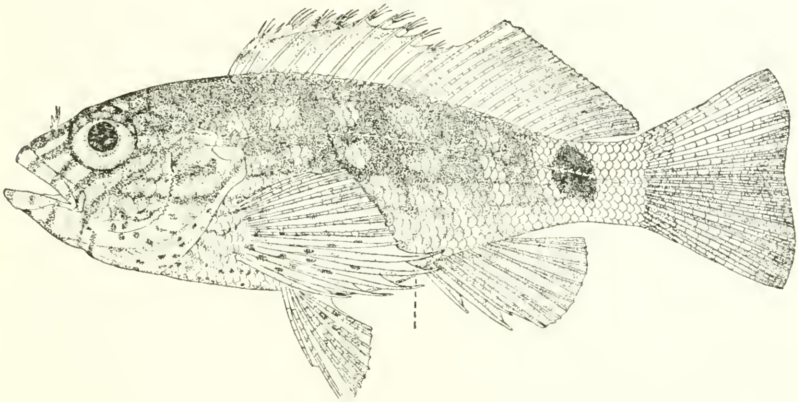

Figure 12.—*Amblycirrhitus hubbardi*, new species: Holotype (U.S.N.M. No. 115750), 35 mm. in standard length.

Counts made on the types: Dorsal rays X, 14 (X, 14; X, 14); anal rays III, 6 (III, 6; III, 6); number of scale rows crossing the lateral line 51 (51; 51); scales between lateral line and base of last dorsal spine 4 (4; 4); scales between lateral line and base of first anal spine 10 (10; 10); number of teeth on preopercular edge 12 or 13 (about 14; 16 or 17); number of scale rows on cheek 5 (5; 5); number of gill rakers on first gill arch——(5+1+12; 5+1+12); pectoral fin formula ii+6+vi R, ii+6 vi L (ii+6+vi R, ii+6+vi L; ii+6+vi R, ii+6+vi L).

Teeth on vomer and head of palatines villiform; a few small canines near front and sides of both jaws anteriorly, becoming villiform and in a narrow to a single row posteriorly; posterior edge of preopercle dorsally with small serrae, the lower edge smooth; scales cycloid; rear margin of caudal fin a little concave; second anal spine longest, third longer than first; lower pectoral rays simple, exserted, the longest reaching to base of second anal spine; anus a little in advance in origin of anal fin; pelvics reaching just past anus but not quite to anal fin base; base of pectoral scaly, these extending out on middle rays a short distance; nape, interorbital, snout, maxillaries, lower jaw, chin, and gill membranes naked; the maxillary extends to under the middle of the pupil; the anterior nostril posteriorly has a flap of skin with about five cirri on it; behind the tips of each dorsal spine is a group of five or six cirri, except the tenth spine, which has only one or two cirri.

Color in alcohol: Body brownish with four or five irregularly vertical rows of pale blotches, one above lateral line and three or four below; head paler below, dark brownish above with numerous lengthwise, wavy, reddish-brown lines; caudal peduncle anteriorly with a large black spot, bordered by a pale circle; wavy lines of head continue on base of pectoral; lower jaw crossed with about six of the wavy brown lines, the anterior three or four extending to eye and on snout; basal two-thirds of anal fin dusky anteriorly.

Remarks.—Amblycirrhitus hubbardi differs from other cirrhitids in the color pattern, combining white blotches on a dark background with a large black ocellated spot on the caudal peduncle.

Although *Cirrhitichthys fasciatus* (Bennett) (=*P. cinctus*) has X, 14 dorsal rays and a color pattern that resembles this new species in some respects, the two differ generically, since *C. fasciatus* has scaly gill membranes and *A. hubbardi* naked gill membranes.

Named *hubbardi* in appreciation of the cooperation rendered by Dr. H. D. Hubbard, Comdr. (M. C.) U. S. N., while we were on the U. S. S. *Bushnell* in the South Pacific.

Genus PARACIRRHITES Bleeker

Paracirrhites BLEEKER, Poissons de Madagascar et de l'île de la Réunion . . ., p. 93, 1875. (Type, *Cirrhites forsteri* Bloch.)

Cirrhitoidea JENKINS, Bull. U. S. Fish Comm., vol. 22 (1902), p. 489, 1903. (Type, *Cirrhitoidea bimacula* Jenkins.)

PARACIRRHITES BIMACULA (Jenkins)

Cirrhitoidea bimacula JENKINS, Bull. U. S. Fish Comm., vol. 22 (1902), p. 488, fig. 36, 1903.

115753, Rose Island, reef, June 11–14, 1939, 2 specimens.

Genus CIRRHITICHTHYS Bleeker

Cirrhitichthys BLEEKER, Act. Soc. Sci. Indo-Neerl., vol. 2, p. 39, 1857. [Type, *Cirrhites graphidopterus* Bleeker (=*Cirrhites aprinus* Cuvier and Valenciennes).]

Paracirrhites STEINDACHNER and DÖDERLEIN, Denkschr. Akad. Wiss. Wien, vol. 48, p. 25, 1883. (Type, *Paracirrhites japonicus* Steindachner and Döderlein.)

Cirrhitopsis GILL, Proc. Acad. Nat. Sci. Philadelphia, 1862, pp. 105, 109. (Type, *Cirrhites aureus* Temminck and Schlegel.)

Isobuna JORDAN, Proc. U. S. Nat. Mus., vol. 33, p. 158, 1907. [Type, *Isobuna japonica* (Steindachner and Döderlein), replaces *Paracirrhites* Steindachner and Döderlein, preoccupied.]

Cyprinocirrhites TANAKA, Dobuts. Zashi (Zool. Mag.), vol. 29, No. 347, p. 268, 1917; Figures and descriptions of the fishes of Japan, No 180, p. 507, pl. 137, fig. 384, 1918. (Type, *Cyprinocirrhites ui* Tanaka.)

Pseudocirrhites MOWBRAY, *in* Breder, Bull. Bingham Oceanogr. Coll., vol. 1, No. 1, p. 48, 1927. (Type, *Pseudocirrhites pinos* Mowbray.)

Acanthocirrhitus FOWLER, Proc. U. S. Nat. Mus., vol. 85, p. 50, 1938. (Type, *Cirrhites oxycephalus* Bleeker.)

?*Neocirrhites* CASTLENAU, Proc. Zool. Acclim. Soc. Victoria, vol. 2, p. 101, 1873. [Type, *N. armatus* Castelnau (referred to here on strength of A. R. McCulloch's Check-list, 1929).]

CIRRHITICHTHYS APRINUS (Cuvier and Valenciennes)

Cirrhites aprinus CUVIER and VALENCIENNES, Histoire naturelle des poissons, vol. 3, p. 76, 1829.

115755, Canton Island, lagoon, April 23 to May 12, 1939, 1 specimen.

115756, Canton Island, lagoon, April 23 to May 12, 1939, 4 specimens.

115757, Canton Island, reef of widest shallow channel, May 13, 1939, 3 specimens.

Since there is a lack of uniformity in color and various characters of this species, I give a detailed description of some of the specimens before me:

Description.—(Based on eight specimens listed above, standard length 55.6; 49.7; 30.5. Detailed measurements of three specimens are expressed in hundredths of the standard length, respectively.) Length of head 34.2; 36.6; 37.3; greatest depth of body 37.4; 38.6; 35.0; length of snout 10.5; 10.9; 11.5; diameter of eye 9.5; 10.3; 11.8; distance from tip of snout to posterior edge of maxillary 12.8; 13.1; 13.4; distance from tip of snout to origin of dorsal fin 34.4; 37.3; 38.6; snout to origin of anal fin 67.7; 70.5; 68.9; distance from posterior base of anal fin to mid-base of caudal fin 23.0; 21.8; 22.6; least depth of caudal peduncle 12.6; 12.1; 12.5; postorbital length of head 17.8; 18.5; 18.7; width of bony interorbital space 4.1; 4.2; 4.9; length of longest ray of pectoral fin 32.9; 31.2; 37.7; length of longest or 4th or 5th dorsal spine 16.6; 16.3; 20.0; length of longest or 1st soft ray of dorsal 18.9; 19.1; 24.3; length of caudal fin 21.6; 21.3; 25.6); length of pelvic fin 22.2; 22.4; 24.6; length of longest or 2nd anal spine 24.8; 22.2; 21.3; least preorbital width 4.1; 4.4; 2.9; fleshy interorbital space 5.9; 6.0; —.

Dorsal rays X, 12; X, 12; X, 12; X, 12; X, 12; X, 12; X, 12; X, 12; anal rays III, 6; III, 6; III, 6; III, 6; III, 6; III, 6; III, 6; III, 6; number of scale rows crossing the lateral line 44; 42; 42; 43; 44; 43; 44; scales between lateral line and base of last dorsal spine 4; 4; 4; scales between lateral line and base of first anal spine 10; 10; 9; number of teeth on posterior edge of preopercle 13; 14; 9; number of scale rows on the cheek 4; 4; 4; number of gill rakers on first gill arch —; 4+10; —; 4+1+10; 4+1+10; 4+1+10; pelvic fin rays I, 5; I, 5; I, 5; pectoral fin formula i+7+vi L, i+7+vi R; i+7+vi L, i+7+vi R; i+7+vi L, i+7+vi R; i+7+vi; i+7+vi; i+7+vi; i+7+vi; i+7+vi; about three or four rows of scales on the opercle.

Villiform teeth on vomer and head of palatines and a few canines at front and sides of both jaws; at front of both jaws inside outer row of conical teeth are patches of villiform teeth; posterior and lower edge of preopercle strongly serrated; above upper edge of gill opening a serrated scale or bony scale; scales cycloid, occurring on lower jaw, except lips and chin, on gill membranes, opercular apparatus, nape, body, base of pectoral and extending out on middle rays one-half their length; on some of the specimens the area behind the nostrils is scaly and in others naked, this character apparently somewhat variable; interorbital space, snout, and maxillaries naked; caudal fin truncate; second anal spine longest; lower pectoral rays simple, exserted, the longest not quite reaching to origin of anal fin; pelvics reaching just past anus but not to origin of anal fin; anus a little in advance of origin of anal fin; the maxillary extends a trifle past front of eye but not to front of pupil; the anterior nostril bears a dermal flap with four or five cirri; peritoneum pale; behind the tips of each dorsal spine occur patches of cirri, numbering four to six.

Color in alcohol: The background is either pale or rather dark, with about five rows of blackish or brownish blotches, always darker than the background, and the pale background separating these is very narrow; above the lateral line on the body the blotches are in one or two, somewhat fused, rows; along base of dorsal fin are six black blotches; below the lateral line the blotches are more distinct, the first row of about seven blotches, the next about six, and the ventral row six or seven; three blotches on cheek, one behind rear edge of maxillary; two pairs on gill membranes; a pair behind chin, more or less the continuation of a streak from eye across maxillary to under lower jaw; upper part of snout blackish; three blotches at base of pectoral fin; pectoral and pelvics plain pale in color; dorsal and caudal fins barred, and with blackish pigment on first soft rays; belly plain pale.

HUGHICHTHYS, new genus

This new genus may be distinguished from all other related genera by the key on page 131, which indicates that it has numerous rows of scales (15 to 20) on the cheek and a scaly gill membrane. From *Cirrhitus* it may be distinguished by the presence of palatine teeth and fewer spines on the preopercle.

Genotype.—Cirrhites melanotus Günther.

Named *Hughichthys* in honor of the late Dr. Hugh M. Smith, who contributed over a long period of years to the knowledge of the fishes of the Pacific area.

HUGHICHTHYS MELANOTUS (Günther)

Cirrhites melanotus Günther, Journ. Mus. Godeffroy, vols. 2–3, pts. 5–6, p. 72, pl. 52, fig. C, 1874.

115754, Hull Island, channel, July 7–17, 1939, 1 specimen.

Genus CIRRHITUS Lacepède

Cirrhitus Lacepède, Histoire naturelle des poissons, vol. 5, p. 2, 1803. (Type, *Cirrhitus maculatus* Lacepède.)

CIRRHITUS PINNULATUS (Bloch)

Labrus pinnulatus Bloch, *in* Schneider, Systema ichthyologiae, p. 264, 1801.

115745, Enderbury Island, reef, May 15–19, 1939, 14 specimens.
115744, Rose Island, reef, June 11–14, 1939, 7 specimens.
115746, Swains Island, reef, May 3–9, 1939, 8 specimens.
52442, Samoa, Jordan and Kellogg, 3 specimens.

Family SIGANIDAE

Genus SIGANUS Forskål

Siganus Forskål, Descriptiones animalium, pp. x, 25, 1775. [Type, *Scarus rivulatus* Forskål (=*Scarus siganus* Forskål).]

My material from the Phoenix and Samoan Islands is too scanty to attempt to key out the species of *Siganus* reported from the region.

SIGANUS SPINUS (Linnaeus)

Sparus spinus Linnaeus, Systema naturae, ed. 10, vol. 1, p. 281, 1758.

This is the species that Jordan and Seale called *S. marmoratus*.

The following description is based on my collections: Caudal fin scarcely forked; ground color darker, with irregular, marbled, whitish narrow bands, much curved dorsally and arranged somewhat longitudinally ventrally; tail and vertical fins marked with faint crossbars; a blackish area dorsally on orbit; nasal flap on anterior nostril a trifle longer than opening in posterior nostril; teeth on upper pharyngeals in two or three rows on each of the three bones; dorsal XIII, 10; anal VII, 9; pectoral 17; teeth about 30+26; gill rakers 6+17.

115210, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 1 specimen.
115211, Tutuila Island, reef at Alofau, June 3, 1939, 7 specimens.
115121, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 23 specimens.
52352, Apia, Samoa, Jordan and Kellogg, 4 specimens.
88068, Apia, Samoa, 3 specimens.
41553, Samoan Island, 1889, Dr. C. H. White, 1 specimen.

SIGANUS ROSTRATUS (Valenciennes)

Amphacanthus rostratus Valenciennes, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 10, p. 158, 1835.

52502, Apia, Samoa, Jordan and Kellogg, 1 specimen.

SIGANUS PUNCTATUS (Bloch)

Amphacanthus punctatus Bloch, *in* Schneider, Systema ichthyologiae . . ., p. 210, 1801.

52494, Apia, Samoa, Jordan and Kellogg, 3 specimens.

Family CHAETODONTIDAE

KEY TO PHOENIX AND SAMOAN ISLAND SUBFAMILIES OF CHAETODONTIDAE

1*a*. Preoperculum serrated or not, but in adult no strong spine near lower angle; pelvics with an axillary scale__________________________ **Chaetodontinae**

1*b*. Preoperculum strongly armed, with a long spine at lower angle; pelvics without an axillary scale__________________________________ **Pomacanthinae**

Subfamily CHAETODONTINAE

KEY TO THE SPECIES OF CHAETODONTINAE FOUND IN THE PHOENIX AND SAMOAN ISLANDS

1*a*. Snout produced into a long narrow tube by excessive prolongation of bones in rostral part of head, length of snout about twice postorbital length of head; pectorals long, falcate, nearly 3 times postorbital part of head; minute teeth in jaws, dorsal rays XII or XIII, 22 to 23; anal about III, 18; about 60 rows of scales on side of body; pelvic fins pale in color; pectorals pale, dorsal edge blackish; caudal pale dusky; anal with posterior margin light, then a submarginal narrow blackish line extends dorsally to join a big black spot in posterior dorsal corner, soft dorsal with dusky posterior margin, the very edge lighter, rest of fin pale; body with a large triangular brownish patch from origin of dorsal to base of pectoral, then forward through pupil of eye to tip of long snout, most intense in front of eye. **Forcipiger longirostris (Broussonet)**

1*b*. Snout not produced into a long narrow tube, but more or less conical, its length about equal to the postorbital length of head; pectoral not falcate; scale rows on side of body 55 or fewer; teeth setiform or brushlike on jaws.

  2*a*. Dorsal rays VI, 28 to 30; anal III, 19 to 20; scales 40 to 45; pelvics pale; pectoral pale; caudal pale; anal with a black spot near its base posteriorly; soft dorsal with a black band along its base; a black spot in dorsal-anal transverse band on soft dorsal fin, latter with a submarginal black band posteriorly; base of spinous dorsal blackish, four transverse black bands: one narrower than eye passes from nape through eye to isthmus, where it meets its fellow on other side; another begins in front of dorsal, passes across pectoral base to pelvic fin base; third one passes from second and third dorsal spines to front of anal fin; fourth from last dorsal spines to base of first soft rays of anal fin. Black ring around caudal peduncle, top of snout blackish_ **Parachaetodon ocellatus (Bloch)**

  2*b*. Dorsal rays XI to XIV.

    3*a*. Fourth dorsal spine prolonged, at least longer than any others, and in some species filamentous; dorsal rays XI or XII, 22 to 27; anal III, 16 to 19; scales 44 to 58; pelvics jet black.

4a. Fourth and fifth dorsal spines longest but in adults shorter than head, all spines rigid and pungent; ground color of body blackish with a pale transverse band from origin of dorsal across operculum to breast and a second pale band from fifth to eighth dorsal spines to top of caudal peduncle and on its upper posterior portion; anal black, very narrow white line along posterior margin of fin; soft dorsal with a pale band on posterior margin; a triangular black band from last three dorsal spines to base of last soft rays, continuing on upper posterior part of caudal peduncle; spiny dorsal black except where pale band from body extends on fifth to eighth spines; pectoral dusky, caudal dusky; dorsal rays XI, 22 or 23; anal III, 17 or 18, pectoral about 15; scale rows about 50 to 55____ **Heniochus varius** (Cuvier)

4b. Fourth dorsal spine prolonged, longer than head in adults and in certain species flexible and produced into a filament.

5a. Two wide black transverse bands across body, one from front of spiny dorsal to pelvics and including them; the second behind long produced filamentous fourth spine from fifth to tenth spines downward and backward to last half of anal fin and across lower anterior corner of caudal peduncle; a black band passes from supraorbital region to eye but not continued below it; upper part of snout blackish, rest of head pale; pectoral fin base black but fin pale; caudal fin pale; soft dorsal pale; ventral or anterior margin of anal fin blackish; dorsal rays XI or XII, 24 to 27; anal III, 16 to 19; scales about 44 to 46_______________ **Heniochus acuminatus** (Linnaeus)

5b. Three black transverse bands across head and trunk.

6a. A wide black band beginning just before origin or dorsal and passing across pectoral fin base to pelvics, front edge passing from front of eye to insertion of pelvics; second band extending from prolonged and flexible fourth spine of dorsal downward and backward to soft rays of anal fin; third extending from across basal region of soft dorsal to top of caudal peduncle; midline of snout blackish; tip of upper lip blackish; pectoral pale; caudal fin pale except where black on peduncle extends on base of soft rays; posterior margin of anal white dorsally; tip of prolonged fourth dorsal spine white; dorsal XII, 22 or 23, anal III, 18 or 19; scale rows about 50 to 53.
Heniochus permutatus Cuvier

6b. A blackish band from origin of dorsal extending downward and covering front part of head orbits, chin, and muzzle, leaving lips and a triangular patch in front of orbits white; a second transverse band extending from fifth to seventh dorsal spine, getting broader while descending to belly, and reaching from origin of pelvics to vent; a third blackish band, narrower and less defined, descending from hind part of spinous dorsal to posterior half of soft anal; interorbital space white, but the supraorbital space more blackish; pectorals plain, base black; caudal fin pale; margin of anal fin black including spines and the posterior half of fin black including spines; soft dorsal pale; dorsal rays XII, 25 or 26; anal III, 18 or 19; scale rows 56 to 58_____________________ **Heniochus monoceros** (Cuvier)

3b. None of dorsal spines prolonged, fourth and fifth not especially longer than other spines; no bony prominences on nape or over eyes.

7a. Dorsal rays XIV, 15 to 17; anal IV (seldom V), 15 or 16; soft dorsal and anal with middle rays prolonged to form an acutely angulate fin; scales about 23 to 29; pelvics pale; light ground color in lower half of body, upper half darker; along midaxis a darkish wide band above, which is a lighter band, sometimes interrupted in middle of body by a dark cross patch; about 18 to 20 transverse black lines, following transverse scale rows, meet near axis of body to form a wide angle pointing forward; front of head brownish; upper lip brown; lower jaw and lower lip pale colored; a wide black band, nearly as wide as eye, and bordered with white, passes from origin of spiny dorsal through eye to meet its fellow on the isthmus; pectoral pale; caudal fin with white margin, then a submarginal black line, then a white band; basal five-sixths of fin black except in one specimen 42 mm. in total length, which has the basal half white; margin of anal with white line, then a black line, rest of fin pale except on a 70 mm. and a 42 mm. specimen, both of which have a large black patch in dorsal posterior corner; margin of soft dorsal with a white line, then a submarginal black line, then a white band except on last few rays where it is interrupted by a black patch, rest of fin pale brownish; in a specimen 70 mm. in total length and one 42 mm. a large black patch with a white border anteriorly occupies the whole posterior half of soft dorsal____________________ **Megaprotodon strigangulus (Gmelin)**

7b. Anal rays III, by exception IV; dorsal spines XII to XIV; soft dorsal and anal with middle rays not especially prolonged, posterior margin of fin more or less evenly rounded.

8a. Pelvic fins black.

9a. Dorsal rays usually XII, 26; anal III, 20 or 21; scales about 44; a wide black band, bordered by yellow, passing from nape and interorbital through eye, band narrower than eye at eye, widening below eye again, to isthmus, thence backward, including pelvic fins; a pale band, yellow in life, crosses body from front of spiny dorsal just behind eye to base of pectoral but ends above base of pelvics; posteriorly body is blackish with about 20 nearly horizontal rows of yellow spots that occupy center of scales, number of rows increases posteriorly; dorsal rows end as they meet lateral line; between lateral line and base of soft dorsal are four rows of yellow spots parallel to that part of lateral line; caudal peduncle black, breast black and midventral side of body to anal fin; lower jaw black, with white spot on lower part of chin; upper lips yellow; snout black; pectoral fin pale; margin of caudal fin white, then a submarginal black band; proximal to latter a white band, then a black band; anal fin mostly black, the very edge white posteriorly, then a submarginal black band and a diffuse pale band, basal four-fifths of anal black; margin of soft dorsal with a line, then a black line, followed by a submarginal white band; basal four-fifths of fin blackish with little yellowish spots on each scale; spinous dorsal whitish.
Chaetodon reticulatus Cuvier

9b. Dorsal rays XIII, 21 to 23; anal III, 18 to 20; scales about 30 to 33, pectoral rays about 14; a black band starts on nape and passes through eye to breast then to pelvics; pelvics black but spines pale; about 15 longitudinal rows of spots, brownish in color, rather diffuse anteriorly, distinct posteriorly; two faint vertical color bars, the first extending from lateral line just behind pectoral to pelvics, and the second from eleventh to thirteenth dorsal spines to origin of anal; area between these faint bars lighter thus causing them to stand out clearer; pectoral fin pale; margin of anal and soft dorsal fins white, then a narrow submarginal black line about width of white margin; caudal fin pale; spiny dorsal pale.

Chaetodon kleinii Bloch

8*b*. Pelvic fins pale.

10*a*. Black band that passes from supraorbital region through eye continues ventrally on isthmus or breast, forming a bluish, blackish, or brownish patch there and often meeting its fellow from the other side.

11*a*. Upper center of body with a large black spot; caudal fin pale without distinct black transverse bands or lines.

12*a*. In upper center of body a large black spot, through middle of which passes lateral line; rest of body pale except a black ring around caudal peduncle and wide black band beginning on supraorbital region of head and passing through eye, its width about equal to eye at eye, thence to breast; top of head dusky; anterior part of body with about six transverse black lines, most intense over pectorals; pectorals pale; margin of anal white and posteriorly a wide submarginal black band narrowing anteriorly and fading out before reaching spinous portion; anterior seven-eighths of anal fin pale dusky; soft dorsal similar to anal; spiny dorsal pale; dorsal rays XIII, 22 or 23; anal III, 18 to 20; scales about 40 to 44.

Chaetodon unimaculatus Bloch

12*b*. A roundish or oval whitish-bordered black spot, its diameter about 1⅔ length of snout, near middle of body, crossed by lateral line at its upper margin; two diverging (bluish in life) brownish curved bands descending from near top of gill opening, one passing across base of pectoral to origin of anal and the other behind pectoral to front third of anal fin; a similar but wider vertical diffuse band across caudal peduncle; a white-bordered brown (blue in life) band runs from nape through eye to isthmus (this band narrower than eye), where more distinct edges of this band can be seen on the isthmus and breast; all fins pale; dorsal rays XIII or XIV, 17 or 18; anal III, 14 to 16; scales 45 or 46.

Chaetodon bennetti Cuvier

11*b*. Upper center of body without an isolated round black spot; caudal fin with one or two blackish transverse bands.

13a. About five narrow blackish lines extending obliquely upward and backward from head, and increased two or three in number on soft dorsal, and at right angles from the fifth line above about 11 blackish lines extend posteroventrally across body; black band through eye meets its fellow below, but nape is pale and band is wedge-shaped above eye, in young this band meeting dorsally in front of origin of dorsal fin; pectorals pale; anal with a narrow submarginal black line; basal half of anal blackish; a submarginal black line extends across the caudal fin, proximally a light band, then a faint dark transverse line; soft dorsal fin with a round black spot, its diameter equal to snout, margin of soft dorsal jet black, including upper edge of long filamentous soft ray, lower margin of this ray white, breaking black margin above black spot, latter sometimes white bordered; spiny dorsal blackish posteriorly; dorsal rays XIII, 23 to 26; anal III, 20 to 22; scales about 30 to 34__ **Chaetodon auriga Forskål**

13*b*. No black lines running at right angles to other black lines on body.

14*a*. Two black bands or lines extending transversely across caudal fin.

15*a*. Pelvics pale, with black spot between them; about six curved black stripes on body and two or three on head, the one around mouth and the one through eye bordered by white, other bands not white-bordered; lower jaw black, but lips pale colored; band through eye narrower than eye, passing from nape to breast and ending in a large blackish patch; a blue band passing from origin of dorsal toward head but ending above head, dorsally this band uniting with another posteriorly near base of second and third dorsal spines and curving downward across preopercle, thence to just above base of pelvics, passing posteriorly near base of anal fin; next band beginning at about tenth dorsal spine, running forward along base of dorsal, curving downward below sixth dorsal spine across rear edge of opercle and base of pectoral, thence backward and across the caudal peduncle, meeting its fellow at posterior angle of soft dorsal and on dorsal edge of caudal peduncle; from below base of about tenth and eleventh dorsal spines a band runs to upper edge of pectoral base; from last dorsal spines another black band curves backward and then forward to behind pectoral fin; from last dorsal spine a band curves across soft dorsal, thence forward to axil of pectoral fin; pectorals pale; besides blackish band along base of the anal there are two submarginal blackish bands, all anal bands separated by white lines; margin of anal fin white; margin of caudal fin white, then a submarginal black band and another across the middle of the fin; margin of soft dorsal and anal white, then a black submarginal band; dorsal rays XII, 23 or 24; anal III, 19 to 21; scales rows 50 to 55.

Chaetodon meyeri Bloch

15*b*. Pelvics pale, no spot between them; about six yellowish bands extending almost horizontally but inclined a little dorsally from head to base of dorsal fin and caudal peduncle; ventralmost one extends on anal fin; a blackish ring or band around mouth; lower jaw black; a black band begins on nape, passes through eye (about width of pupil) to isthmus, and meets its fellow there to form a black patch; a black band continuing from base of dorsal passes rear edge of eye to lower angle of preopercle; a blackish band crosses front of opercle and another narrow at rear edge of opercle; pectoral pale; margin of caudal white, then a submarginal black band, and a wide black band crosses center of fin; anal has a black margin with a fine white line at very edge posteriorly, and a wide diffuse black band crosses the center of fin; margin of soft dorsal black, then a submarginal black band continuing forward along base of spiny dorsal to join with band that passes across head just back of eye; dorsal rays XII or XIII, 25 or 26; anal III, 21 or 22; scales 50 to 55. **Chaetodon ornatissimus** Cuvier and Valenciennes

14*b*. A single black band or line across caudal fin.

16*a*. Width of black band as it passes through eye about width of pupil and much narrower than eye.

17*a*. Upper part of body, from about on level with upper end of gill opening, brownish, with a pale large spot in center of brownish area, below bases of sixth and seventh dorsal spines; a smaller pale spot, sometimes almost lacking, below ninth or tenth dorsal spine; caudal peduncle with a larger black saddle above and a smaller one below; in young these often meet to form a ring; about 16 rows of spots or lines of dark color radiate posteriorly and a little upward, almost horizontally beginning from head to breast; a black band about width of pupil beginning on upper nape passes through eye to isthmus, where it ends as a simple single median round blackish spot; pectoral plain; margin of anal fin white; most of fin light brownish, more intense distally, anterior base with a blotch sometimes faint; transverse black line across middle of caudal fin; soft dorsal same as anal but without the basal spot; dorsal rays XII, 19 or 20; anal III, 17 or 18, scales about 35 to 40_ **Chaetodon melannotus** Bloch

17*b*. About 14 or 15 horizontal blackish or brownish lines beginning behind head and all the dorsal ones ending at a white line near base of soft dorsal, ventral ones just fading out posteriorly; front of head, lower jaw, and lips black; top of caudal peduncle with a black patch anteriorly where the color from soft dorsal black band extends, this black band bordered with white; behind eye a narrow transverse band extending upward to below base of spiny dorsal; black band beginning on nape and extending through eye, is white bordered and about width of pupil as it passes through eye to isthmus, where there is a diffuse black patch, below eye the area each side this eye band is white; pectoral pale; margin of anal with white band, though some specimens have very tips of rays tinged with blackish, a submarginal wide black band or patch occupying outer ½ or ⅔ of fin, below this a white line that borders another black band in basal ⅓ of fin, white on dorsal side of black band extending forward to anus; white margin on soft dorsal, tips of rays tinged with blackish, a submarginal black line, then a white band followed by a diffuse black line, then in basal one-third of fin a wide black band extending on upper part of caudal peduncle bordered anteriorly with white; margin of caudal fin pale, then a submarginal wide transverse black band crosses the middle of the fin, this band white bordered; dorsal rays XIII or XIV, 19 to 23; anal III, 19 or 20, scales 38 to 44_ **Chaetodon trifasciatus** Mungo Park

16*b*. Width of blackish-brown band as it passes through eye much wider than eye so that nearly half of color band is behind the eye, this black band extending from occiput to isthmus and partially or completely interrupted on front of head above eye by a triangular whitish area; a large crescent-shaped patch from base of soft dorsal and last dorsal spines to posterior half of base of soft anal, gradually narrowing toward anal, this patch extending on base of caudal peduncle; from base of dorsal spines and base of crescent-shaped patch about 20 dark lines, following vertical series of scales running downward to below level of pectorals; ventral posterior margin of anal with diffuse blackish line, rest of fin pale; margin of caudal hyaline with a black submarginal line; soft dorsal pale; dorsal rays XII, 24 to 27; anal III, 20 or 21, scales about 20 to 22.

Chaetodon lineolatus Cuvier

10*b*. Black band that passes from supraorbital region through eye and often continuing below it does not reach isthmus or breast, always ending above or on branchiostegal membranes.

18*a*. Caudal peduncle with a black spot dorsally or ventrally or with a black ring or saddle.

19*a*. One or two black lines or bands across caudal fin, posterior margin of fin always pale or hyaline.

20*a*. Anal fin with a wide black band on its margin; spines and soft rays of dorsal with black marginal band as on anal fin; from in front of spiny dorsal along its base to sixth or seventh spine is a white-bordered (yellow in life) black band that then passes downward and forward to above pectoral base, widening downward and abruptly ending just at back of head where its width is one-half head, this black blotch with a central light area below front of spiny dorsal; near base of soft dorsal is a white-bordered black crescent-shaped band increasing in width to caudal peduncle, where it ends as a black spot not meeting its fellow below; 35-mm. specimens have two ocellated spots, one on soft dorsal and the other on caudal peduncle, and black patch above pectoral not yet wedge-shaped; black band that passes from interorbital region through eye to angle of preopercle is wider than eye at orbit; pectoral pale; caudal with hyaline margin, then a submarginal black band, followed by another diffuse one across the rays; dorsal rays XII, 23 to 25; anal III, 18 to 20; scales about 38 to 40________________ Chaetodon lunula (Lacepède)

20*b*. Anal fin with hyaline or pale margin.

21*a*. On trunk descend two triangular wide vertical bands, one from about third and fourth dorsal spines to below lateral line or to below pectoral, the second from front of soft dorsal including the last dorsal spines to about lateral axis; 10 to 15 vertical dark lines often rather faint on sides of trunk; caudal peduncle with blackish ring; eye crossed with a white bordered brownish band as wide as eye that begins much narrower on nape and runs to branchiostegals, where it is not united with its fellow below; black caudal ring faintly continued on anal and soft dorsal fins as two darkish lines; margin of soft dorsal with faint darkish lines; dorsal rays XII, 24 to 27, anal III, 20 to 22, scale rows about 25__ Chaetodon facula Bloch

21*b*. About six obliquely transverse brownish lines above pectoral fin, and at right angles to these about 11 similar brownish lines extend obliquely downward; across caudal peduncle a black band extends from dorsal and anal fins; a black band, about width of eye, extends from nape through eye, ending on branchiostegals; pectoral fin pale; margin of caudal fin white then a submarginal black band across center of fin semi-lunar-shaped; margin of anal white then a submarginal narrow black band; margin of soft dorsal with black band anteriorly below it a white band increasing in width posteriorly so that it occupies the whole of soft dorsal except base posteriorly; basal part of soft dorsal with a wide crescent-shaped black band that crosses caudal peduncle and extends nearly to middle of soft anal fin rays; tips of dorsal spines white, then a submarginal black area, then white, basal black band on soft dorsal extends forward as a narrow black band along middle of spiny dorsal fading near its origin; dorsal rays XIII, 22 to 25; anal III, 20 to 22, scale rows about 30 to 35.
Chaetodon vagabundus Linnaeus

19*b*. Caudal fin pale without black transverse lines or bands.

22*a*. Color pattern on body not consisting of several blackish lines or rows of spots on scales, but upper part of body blackish, this color extending upon spiny dorsal, thence posteriorly along soft dorsal to encompass the caudal peduncle; under about ninth or tenth dorsal spines on body is a white spot, lower edge touching lateral line, a second white area (a spot in young) on anterior one-third of soft dorsal base joins light color of lower half of body; two parallel lines pass through eye one, at front and other at rear of eye, not meeting above in midline, and area between them pale, ending on branchiostegals; pectoral pale; margin of anal with a wide white band, although very outer edge has a dark line, then a submarginal black line, then a diffuse one proximally, basal region of anal white; very edge of soft dorsal with a black line, below which is a wide white band, then a submarginal black line, followed proximally by a diffuse darkish line, basal two-thirds of soft and spiny dorsal fin blackish; dorsal rays XIV, 22 or 23; anal rays III, 17 or 18; scale rows about 38 to 42______________ Chaetodon quadrimaculatus Gray

22*b*. Color pattern on body consisting of several dark lines or narrow bands or rows of spots.

23*a*. Color pattern consisting of about 12 to 14 rows of tiny spots extending horizontally on body, and one row on lower part of caudal peduncle; top of caudal peduncle with a blackish spot; from nape a black band passes through eye, wider than eye below eye and broadest on lower part of cheek, reaching to branchiostegals but not to isthmus; pectoral pale; caudal fin pale, basal portion darker; margin of anal white, then a narrow submarginal line, base with a black line anteriorly, widening into a wide patch on basal half of last rays; margin of soft dorsal white with a black line below it, middle of fin with a wide black band; basal third of fin same as color of body; prolonged soft ray darkish; wide black band on soft dorsal continues forward along basal two-thirds of spiny dorsal; dorsal rays XIV, 21 to 25; anal III, 20 to 22; scales about 33 or 34
Chaetodon semeion Bleeker

23*b*. Color pattern consisting of blue or dark spots on center of scales arranged in 10 or 11 distinct vertical or slightly inclined series present only on anterior half of body and restricted to its upper part above a horizontal line through pectoral; besides these distinct rows of spots there are diffuse rows arranged more or less horizontally; caudal peduncle with a black band; a black band from nape and supraorbital region through eye, widest above eye, below eye much narrower and ending still narrower above isthmus on branchiostegals; pectoral pale; anal and soft dorsal posteriorly with very edge white, below this a narrow dark line with a whitish bar adjoining submarginally; dorsal rays XIII, 22 or 23; anal III, 18 to 20; scales 40 to 44.
Chaetodon miliaris Quoy and Gaimard

18*b*. Caudal peduncle pale, without large black spots or bands.

24*a*. Dorsal posterior part of body, including central and basal portion of soft dorsal, occupied with a large subovate black patch, bordered ventrally with a broad white band; below this pale, with six or seven diffuse purple or violet longitudinal stripes fading dorsally; usual band through eye almost entirely lacking below eye and above it, wedge-shaped and narrower than pupil; pectoral pale; anal pale except for a narrow diffuse darkish marginal line and a submarginal one more diffuse across central portion; caudal pale except for a line of blackish pigment along side of each ray, and upper and lower margins whitish; soft dorsal with a diffuse marginal black line behind or below long filamentous ray and a jet-black submarginal one separated from outer one by a white band, and from black patch of body by a yellow or light band; this submarginal black line continues a short distance out the long ray, forming a black line on its ventral margin; large black patch of body continues out center of filamentous ray, upper margin of this ray white; dorsal rays XIII, 24 to 26; anal III, 21 to 22; scale rows about 34 to 37____________________ **Chaetodon ephippium Cuvier**

24*b*. No large black patch occupying entire posterior dorsal area of body.

25*a*. Caudal without a jet-black transverse band across middle of fin.

26*a*. Color pattern of about 18 rows of small blackish spots arranged longitudinally and radiating posteriorly from head; caudal peduncle pale; black band begins at origin of dorsal, passes through eye, its width narrower than eye but not extending on isthmus or breast; pectoral pale; anal fin with a wide black marginal band, then a yellow band, rest of fin, about three-fourths of it, pale; caudal pale; black band through eye continues as a marginal narrow line on spinous dorsal and as a submarginal line on soft dorsal, very edge of fin whitish; dorsal rays XIV, 20 to 22; anal III, 15 to 17; pectoral 15; scale rows about 38 to 42________ **Chaetodon citrinellus Cuvier**

26*b*. Color pattern of four to eight or more transverse narrow blackish bands across body with an anteriorly directed angle near axis of body, fifth and sixth to tenth bands progressively smaller, ending at a narrow blackish or brownish line that extends from middle of twelfth dorsal spine downward across middle of anal base, curving posteriorly to end in a darker patch just behind tip of last anal spine; transverse bands do not meet ventrally but end a short distance above ventral side of body; posterior part of body pale; caudal peduncle pale; a white-bordered black band passes from nape through eye, its width at eye being that of pupil, but wider above it ending in diffuse pigment on lower part of opercular apparatus; snout a little brownish; lips white; pectoral pale; a diffuse pale-darkish area in anterior half of anal fin, its margin white, then occurs a submarginal black line; a faint transverse submarginal line on caudal fin, its base a trifle pigmented; membranes between dorsal spines brownish, intensely colored anteriorly; dorsal rays XIII, 22 anal III, 16 to 17, scales about 29 to 30_______________ **Chaetodon mertensii Cuvier**

25*b*. Caudal with a jet-black transverse band across middle of fin.

27*a*. Body pale, with faint pigment near edges of scales, thus giving appearance of a faint cross pattern of lines following rows of scales; upper part of body over pectoral fin with a large faint patch of dark pigment; black band from nape passes through eye, band narrower than eye, to branchiostegal membranes but not on breast; pectoral pale; caudal peduncle pale; wide white margin on caudal fin, center of fin crossed with a black band, very wide at midaxis of fin but tapering to a point dorsally and ventrally; margin of anal white, then a submarginal black line the proximal five-sixths of fin pale; margin of soft dorsal white, then a submarginal black band increasing in width to near end of fin, then below it a white band of similar contour but narrower, rest of fin darker with large yellow spots on scales; spinous dorsal with a diffuse narrow submarginal blackish band; dorsal rays XIII, 21, anal III, 19, scale rows about 29__________ Chaetodon rafflesii Bennett

27*b*. About six black bands inclined upward across body and ending in soft dorsal, except ventral one, which ends in front of base of last anal rays; these bands begin in middle of body and are preceded by rows of blackish spots; often between the more obvious bands are narrower ones; a black patch in front of origin of dorsal is more or less continuous with band through eye, this band with a light center and the black lines bordering it narrower below eye than above, the band fading on lower part of cheek; pectoral pale; caudal fin with a black band across center of fin; soft dorsal with white margin, then a submarginal black line, below this the fin a little pigmented; anal same as soft dorsal; dorsal rays XIII, 23; anal III, 18; scales about 45.
Chaetodon pelewensis Kner

Genus FORCIPIGER Jordan and McGregor

Forcipiger JORDAN and MCGREGOR, in Jordan and Evermann, U. S. Nat. Mus. Bull. 47, pt. 2, p. 1671, 1898. (Type, *Chelmon longirostris* Cuvier and Valenciennes.)

FORCIPIGER LONGIROSTRIS (Broussonet)

Chaetodon longirostris BROUSSONET, Ichthyologia, sistens piscium descriptiones et icones, p. 6, pl. 7, 1782.

52282, Apia, Samoa, Jordan and Kellogg, 1 specimen

Genus PARACHAETODON Bleeker

Parachaetodon BLEEKER, Versl. Med. Akad. Amsterdam, ser. 2, vol. 8, p. 371, 1874. (Type, *Chaetodon oligacanthus* Bleeker.)

PARACHAETODON OCELLATUS (Bloch)

Chaetodon ocellatus BLOCH, Naturgeschichte der ausländischen Fische, pt. 2, p. 105, pl. 211, fig. 2, 1787.

No specimen in National Museum from Phoenix or Samoan Islands.

Genus HENIOCHUS Cuvier

Heniochus Cuvier, Règne animal, ed. 1, vol. 2, p. 335, 1817. (Type, *Chaetodon macrolepidotus* Bloch.)

HENIOCHUS VARIUS (Cuvier)

Taurichthys varius Cuvier, Règne animal, ed. 2, vol. 2, p. 128, 1829.

115068, Tutuila Island, reef at entrance to Pago Pago Bay, June 2, 1939, 1 specimen.

52515, Apia, Samoa, Jordan and Kellogg, 1 specimen.

HENIOCHUS ACUMINATUS (Linnaeus)

Chaetodon acuminatus Linnaeus, Systema naturae, ed. 10, p. 272, 1758.

52471, Apia, Samoa, Jordan and Kellogg, 1 specimen.

HENIOCHUS PERMUTATUS Cuvier

Heniochus permutatus Cuvier, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 7, p. 99, 1830.

115067, Tutuila Island, reef at entrance to Pago Pago Bay, June 2, 1939, 2 specimens.

115066, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 3 specimens.

52523, Pago Pago, Samoa, Jordan and Kellogg, 3 specimens.

HENIOCHUS MONOCEROS Cuvier

Heniochus monoceros Cuvier, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 7, p. 100, 1831.

No specimens in National Museum from Phoenix and Samoan Islands.

Genus MEGAPROTODON Guichenot

Megaprotodon Guichenot, Rev. Zool., vol. 11, p. 12, 1848. (Type, *Chaetodon bifasciatus* Cuvier and Valenciennes.)

MEGAPROTODON STRIGANGULUS (Gmelin)

Shaetodon striganguli Gmelin, Systema naturae, ed. 13, p. 1269, 1788.

Color notes from crayon sketches: *Adult:* Marginal area of spiny and soft dorsal orange; upper lip and tip of snout orange; band through eye bordered with white, then yellow; base of pectoral orange; anal orange below the submarginal black line; rear margin of anal, soft dorsal, and caudal hyaline; upper and lower margins of caudal peduncle yellow; caudal peduncle and basal half of caudal fin black, then a transverse band of yellow-orange; pelvics yellow. *Young:* Anterior part of head yellow; band through eye similar to adult; pelvics yellow; posterior part of body from soft dorsal to anal black, the outer angles of soft dorsal and anal yellow; caudal peduncle and basal half of caudal fin yellow instead of black as in adult.

115060, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 2 specimens.

115061, Canton Island lagoon, coral heads, May 23–25, 1939, 6 specimens.

Genus CHAETODON Linnaeus

Chaetodon Linnaeus, Systema naturae, ed. 10, vol. 1, p. 272, 1758. (Type, *Chaetodon capistratus* Linnaeus.)

CHAETODON RETICULATUS Cuvier

Chaetodon reticulatus Cuvier, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 7, p. 32, pl. 171, 1831.

115042, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 1 specimen.

115041, Rose Island reef, June 11–14, 1939, 14 specimens.

52225, Apia, Samoa, Jordan and Kellogg, 4 specimens.

CHAETODON KLEINII Bloch

Chaetodon kleinii Bloch, Naturgeschichte der ausländischen Fische, pt. 4, p. 7, pl. 218, fig. 2, 1790.

115062, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 1 specimen.

45090, Samoa, Rev. S. G. Whitmee, 2 specimens.

CHAETODON UNIMACULATUS Bloch

Chaetodon unimaculatus Bloch, Naturgeschichte der ausländischen Fische, pt. 3, p. 75, pl. 201, fig. 1, 1787.

115051, Rose Island reef, June 11–14, 1939, 1 specimen.

115052, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 3 specimens.

115053, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 2 specimens.

52324, Apia, Samoa, Jordan and Kellogg, 4 specimens.

CHAETODON BENNETTI Cuvier

Chaetodon bennetti Cuvier, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 7, p. 84, 1831.

115040, Enderbury Island, reef, May 15 to 19, 1939, 1 specimen.

115039, Hull Island, channel, July 7–17, 1939, 1 specimen.

CHAETODON AURIGA Forskål

Chaetodon auriga Forskål, Descriptiones animalium, pp. xii, 60, 1775.

115049, Rose Island reef, June 11–14, 1939, 4 specimens.

115048, Rose Island lagoon, June 12–20, 1939, 5 specimens.

115026, Hull Island channel, July 8–12, 1939, 1 specimen.

115050, Canton Island lagoon, April 23 to May 12, 1939, 1 specimen.

115047, Canton Island lagoon, May 25–26, 1939, 5 specimens.

115025, Canton Island, reef on ocean side, April 25–28, 1939, 2 specimens.

115024, Hull Island, channel, July 7–17, 1939, 5 specimens.

115027, Canton Island lagoon, coral head, May 25, 1939, 1 specimen.

57001, Apia, Samoa, 2 specimens.

52344, Apia, Samoa, Jordan and Kellogg, 5 specimens.

CHAETODON MEYERI Bloch

Chaetodon meyeri BLOCH, *in* Schneider, Systema ichthyologiae . . ., p. 233, 1801.

115034, Enderbury Island reef, May 15–19, 1939, 1 specimen.

CHAETODON ORNATISSIMUS Cuvier and Valenciennes

Chaetodon ornatissimus CUVIER and VALENCIENNES, Histoire naturelle des poissons, vol. 7, p. 22, 1831.

115037, Enderbury Island reef, May 15–19, 1939, 1 specimen.

52318, Apia, Samoa, Jordan and Kellogg, 3 specimens.

CHAETODON MELANNOTUS Bloch

Chaetodon melannotus BLOCH, *in* Schneider, Systema ichthyologiae . . ., p. 224, 1801.

52313, Apia, Samoa, Jordan and Kellogg, 4 specimens.

CHAETODON TRIFASCIATUS Mungo Park

Chaetodon trifasciatus MUNGO PARK, Trans. Linn. Soc. London, vol. 3, p. 34, 1797.

115035, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 3 specimens.

115036, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 7 specimens.

52427, Apia, Samoa, Jordan and Kellogg, 11 specimens.

57002, Apia, Samoa, Jordan and Kellogg, 3 specimens.

CHAETODON LINEOLATUS Cuvier

Chaetodon lineolatus CUVIER, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 7, p. 40, 1831.

No collection in National Museum from Phoenix and Samoan Islands.

CHAETODON LUNULA (Lacepède)

Pomacentrus lunula LACEPÈDE, Histoire naturelle des poissons, vol. 4, pp. 507, 511, 513, 1803.

115012, Canton Island, reef on ocean side, April 25–28, 1939, 1 specimen.

115013, Rose Island lagoon, June 12–20, 1939, 1 specimen.

115015, Tutila Island, reef at Alofau, June 3, 1939, 1 specimen.

115014, Swains Island reef, May 3–9, 1939, 1 specimen.

115016, Hull Island, channel, July 7–17, 1939, 4 specimens.

115018, Hull Island, channel, July 8–12, 1939, 4 specimens.

115017, Rose Island reef, June 11–14, 1939, 8 specimens.

115173, Enderbury Island reef, May 18, 1939, Wm. Tavaras, 1 specimen.

52299, Apia, Samoa, Jordan and Kellogg, 4 specimens.

57000, Apia, Samoa, Jordan and Kellogg, 2 specimens.

88058, Apia, Samoa, 1 specimen.

CHAETODON FACULA Bloch

Chaetodon facula BLOCH, Naturgeschichte der ausländischen Fische, pt. 7, p. 102, pl. 325, fig. 2, 1793.

52452, Apia, Samoa, Jordan and Kellogg, 3 specimens.

CHAETODON VAGABUNDUS Linnaeus

Chaetodon vagabundus LINNAEUS, Systema naturae, ed. 10, p. 266, 1758.

115030, Tutuila Island, reef at Alofau, June 3, 1939, 2 specimens.

115029, Rose Island lagoon, June 12 to 20, 1939, 1 specimen.

115028, Tutila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 6 specimens.

52497, Apia, Samoa, Jordan and Kellogg, 8 specimens.

CHAETODON QUADRIMACULATUS Gray

Chaetodon quadrimaculatus GRAY, Zool. Misc., p. 33, 1833.

115055, Hull Island, channel, July 8–12, 1939, 1 specimen.

115054, Rose Island lagoon, June 12–20, 1939, 1 specimen.

115056, Rose Island reef, June 11–14, 1939, 24 specimens.

CHAETODON SEMEION Bleeker

Chaetodon semeion BLEEKER, Nat. Tijdschr. Ned. Ind., vol. 8, p. 450, 1855.

52449, Apia, Samoa, Jordan and Kellogg, 1 specimen.

CHAETODON MILIARIS Quoy and Gaimard

Chaetodon miliaris QUOY and GAIMARD, Voyage autour du monde . . . *Uranie*, Zool., p. 380, pl. 62, fig. 6, 1825.

No collection in National Museum from the Phoenix and Samoan Islands.

CHAETODON EPHIPPIUM Cuvier

Chaetodon ephippium CUVIER, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 7, p. 80, pl. 174, 1831.

115032, Hull Island, channel, July 7–17, 1939, 3 specimens.

115033, Hull Island, channel, July 8–12, 1939, 1 specimen.

115031, Rose Island reef, June 11–14, 1939, 7 specimens.

52503, Apia, Samoa, Jordan and Kellogg, 9 specimens.

CHAETODON CITRINELLUS Cuvier

Chaetodon citrinellus CUVIER, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 7, p. 27, 1831.

115019, Rose Island reef, June 11–14, 1939, 3 specimens.

115021, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 6 specimens.

115023, Rose Island lagoon, June 15–19, 1939, 2 specimens.

115020, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 1 specimen.

115022, Tutuila Island, reef at Alofau, June 3, 1939, 3 specimens.

52513, Apia, Samoa, Jordan and Kellogg, 5 specimens.

83313, Samoa or Fiji ?, Wilkes Exploring Expedition, 4 specimens.

CHAETODON MERTENSII Cuvier

Chaetodon mertensii CUVIER, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 7, p. 47, 1831.

52514. Apia, Samoa, Jordan and Kellogg, 2 specimens.

CHAETODON RAFFLESII Bennett

Chaetodon rafflesii BENNETT, Memoir of the life and public services of Sir Stamford Raffles, p. 689, 1830.

115046, Rose Island reef, June 11–14, 1939, 1 specimen.
52325, Apia, Samoa, Jordan and Kellogg, 4 specimens.

CHAETODON PELEWENSIS Kner

Chaetodon pelewensis KNER, Sitzb., Akad. Wiss. Wien, vol. 57, pt. 1, p. 306, 1868.

115045, Rose Island reef, June 11–14, 1939, 5 specimens.

115044, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 1 specimen.

115043, Rose Island lagoon, June 12 to 20, 1939, 2 specimens.

52196, Apia, Samoa, Jordan and Kellogg, 4 specimens.

Subfamily POMACANTHINAE

KEY TO THE SPECIES OF POMACANTHINAE FROM THE PHOENIX AND SAMOAN ISLANDS

1*a*. Scales in about 90 irregular rows crossing side of body; hind margin of preorbital not free; dorsal rays XIV, 19 to 21; anal III, 18 to 21; color pattern different on specimens longer and shorter than about 100 mm. in length; our specimens 48 to 85 mm. with following color pattern: General color blackish with a wide white ring just in front of caudal peduncle, then around this a pale semicircular line, then a wide white semicircular band extending on soft dorsal and anal; anteriorly a pale crescentic line, then a white crescentic band just behind base of pectorals; a white band extending from nape back of eye to base of preopercular spine, thence curving to base of pelvics, two others on head one below front of eye and one across snout to isthmus; margin of dorsal white; posterior half of caudal fin pale, basal portion blackish with one or two transverse white lines; caudal peduncle with one or two transverse white lines; these white lines on body and fins are variable and often between those described will occur shorter and paler lines in addition; pelvics black; middle of chin with white patch. Adults of this species with a black patch above pectoral that extends on chest and throat; 15 to 25 yellowish bands on body, nearly horizontal but inclined a little upward, reaching dorsal and anal fins; a brownish band from interorbital space through eye to angular spine________________________________ **Pomacanthus imperator** (Bloch)

1*b*. Scales in about 50 rows on side of body; lateral line terminating near end soft dorsal.

  2*a*. Interoperculum[16] without spines, posteriorly with a narrow branch reaching to suboperculum; preorbital convex, without spines, its hind margin not free, not serrated; interorbital width greater than eye; body with about seven or eight black-bordered, white (bluish in life), nearly transverse bands, the first on trunk from first dorsal spine to above base of pectorals, the last on caudal peduncle with another bluish bar across base of caudal fin, rest of fin pale (yellow in life); about four or five bluish bands across anal, these continuations of those on body; dorsally body bands continuing on dorsal fin, posterior three-fourths of soft dorsal blackish; mouth pale; median band on snout; curved one on interorbital and one from nape to rear upper corner of eye; pectoral and pelvics pale______________________ **Pygoplites diacanthus** (Boddaert)

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[16] After Weber and de Beaufort, 1936, p. 122.

2*b*. Interoperculum[16] serrated or with spines posteriorly, remote from suboperculum; hind margin of preorbital free, serrated or with strong spines; interorbital width equal to or less than eye.

3*a*. Body uniform yellowish on adults but a black spot near center of body on young (my specimen 31 mm., Rose Island); margin of soft dorsal, anal, and caudal fins with a black line; narrow black ring around eye; vertical black band across opercle; chin and sometimes tip of snout somewhat pigmented with black, base of preopercular spine sometimes with a little black pigment; dorsal rays XIV, 15, anal III, 15, scales about 46________________ **Centropyge flavissimus** (Cuvier)

3*b*. Body not uniformly colored yellowish as in 3a.

4*a*. Anterior part of body yellowish, sharply contrasting with blackish posterior part of body, change in color occurring from sixth to seventh dorsal spine to just in front of anus; from nape a black band extending to eye; head dusky; caudal fin pale or yellowish; margin of dorsal pale, pectoral pale; dorsal rays XV, 15, anal III, 17; scales about 46_________________ **Centropyge bicolor** (Bloch)

4*b*. Body with about 18 narrow transverse streaks of bluish black; ground color deep orange, paler below; anal and dorsal edged with blue; caudal fin with a broad blue submarginal stripe; dorsal, anal, and caudal fins blackish; pectorals and pelvics pale, dorsal rays XIV, 17; anal III, 15, scales about 40__ **Centropyge bispinosus** (Günther)

Genus POMACANTHUS Lacepède

Pomacanthus Lacepède, Histoire naturelle des poissons, vol. 4, p. 525, 1803. (Type, *Chaetodon arcuatus* Linnaeus, as restricted by Cuvier.)

POMACANTHUS IMPERATOR (Bloch)

Chaetodon imperator Bloch, Naturgeschichte der ausländischen Fische, vol. 3, p. 51, pl. 174, 1787.

115057, Rose Island reef, June 11–14, 1939, 1 specimen.

115059, Tau Island, reef at Siulagi Pt., June 27, 1939, 2 specimens.

115058, Tutuila Island, reef at Alofau, June 3, 1939, 1 specimen.

52247, Pago Pago, Samoa, Jordan and Kellogg, 1 specimen; this collection was reported upon by Jordan and Seale, 1906, as *Holocanthus nicobariensis*.

Genus PYGOPLITES Fraser-Brunner

Pygoplites Fraser-Brunner, Proc. Zool. Soc. London, 1933, p. 587. (Type, *Holacanthus diacanthus* Boddaert.)

PYGOPLITES DIACANTHUS (Boddaert)

Chaetodon diacanthus Boddaert, Epistola . . . de Chaetodonte diacantho descripto, p. 19, 1772.

115064, Rose Island lagoon, June 12 to 20, 1939, 1 specimen.

52493, Pago Pago, Samoa, Jordan and Kellogg, 4 specimens.

56998, Pago Pago, Samoa, Jordan and Kellogg, 2 specimens.

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[16] After Weber and de Beaufort, 1936, p. 122.

Genus CENTROPYGE Kaup

Centropyge Kaup, Archiv Naturg., vol. 26, pt. 1, p. 140, 1860. (Type, *C. tibicen* Kaup.)

CENTROPYGE FLAVISSIMUS (Cuvier)

Holacanthus flavissimus Cuvier, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 7, p. 197, 1831.

115065, Hull Island channel, July 7–17, 1939, 3 specimens.
115063, Rose Island lagoon, June 12–20, 1939, 1 specimen.
52472, Pago Pago, Samoa, Jordan and Kellogg, 5 specimens.

CENTROPYGE BICOLOR (Bloch)

Chaetodon bicolor Bloch, Naturgeschichte der ausländischen Fische, pt. 3, p. 94, pl. 206, fig. 1, 1787.

56995, Pago Pago, Samoa, Jordan and Kellogg, 11 specimens.
52301, Samoa, Jordan and Kellogg, 4 specimens.

CENTROPYGE BISPINOSUS (Günther)

Holacanthus bispinosus Günther, Catalogue of the fishes of the British Museum, vol. 2, pp. 48, 516, 1860.

The specimens from Pago Pago reported upon by Jordan and Seale, 1906, were described as *Centropyge tutuilae* Jordan and Jordan, and the type, No. 3902, is in the Carnegie Museum; the paratype, No. 8750, is at Stanford University.

Family ZANCLIDAE

Genus ZANCLUS Cuvier

Zanclus Cuvier, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 7, p. 102, 1831. (Type, *Chaetodon cornutus* Linnaeus.)

ZANCLUS CORNUTUS (Linnaeus)

Chaetodon cornutus Linnaeus, Systema naturae, ed. 10, p. 273, 1758.

All the Samoan specimens lack the recurved spine above angle of mouth as found in *Z. canescens*.

Dorsal rays VII, 40–41, anal III, 31–35. Three wide vertical black bars, one through region of gill opening to origin of dorsal; the second from middle of base of anal to middle of dorsal, the last across the caudal fin; region of lower jaw black; midline of snout black, and two narrow lines blackish in color running from same point on side of snout to midline of snout, one forward and the other backward; pelvics black.

115010, Rose Island reef, June 11–14, 1939, 1 specimen.
115009, Swains Island reef, May 3–9, 1939, 1 specimen.
115011, Tutuila Island, reef at Alofau, June 3, 1939, 2 specimens.
115008, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 5 specimens.

52506, Pago Pago, Samoa, Jordan and Kellogg, 5 specimens.
56994, Pago Pago, Samoa, 3 specimens.
82945, Samoa, Wilkes Exploring Expedition, 3 specimens.

Family ACANTHURIDAE

KEY TO THE GENERA AND SPECIES OF ACANTHURIDAE FROM THE PHOENIX AND SAMOAN ISLANDS

1a. Tail armed with a single sharp, antrorse, erectile spine, fitting into a groove; caudal spine often obsolete in young specimens.

2a. Teeth long, movable, on pedicels or bristlelike, expanded at tips or with cupped denticulate tips, about 36 to 40 in upper jaw and 38 to 46 in lower jaw; dorsal rays VIII (rarely IX), 28 to 30; anal rays III, 26 or 27; pectoral I, 16, pelvic rays I, 5; gill rakers about 9 to 11+21 to 23; ground color blackish, sides of body with faint purplish or bluish wavy lines; all fins blackish; caudal fin lunate.

Ctenochaetus strigosus (Bennett)

2b. Teeth immovable, not on long pedicels, but broad, lobate, and fewer than 30 in upper or lower jaws; pelvic rays I, 5.

3a. Dorsal spines IX, rarely VIII or X.

4a. Posterior or lower margin of operculum with a white band or area that occurs in specimens with regularity down to at least 60 mm. in standard length; ground color of head and trunk blackish.

5a. A pale blotch below eye, upper posterior margin of opercle with a narrow white band; lips pale with a U-shaped band on lower side of chin extending much above maxillaries; spine on caudal peduncle pale but area around it black; margin of dorsal and anal fins white, rest of fins blackish except along their bases a white line widens posteriorly to include two-thirds to three-fourths of basal portion of fins; pectorals dusky; pelvics black with their outer margin pale; anus pale; caudal fin pale-dusky but abruptly paler than caudal peduncle, margin of caudal fin white, then a wide dusky submarginal band, followed by a narrow pale band, basal two-thirds of this fin pale-dusky, sharply contrasting with black caudal peduncle; dorsal rays about IX, 30; anal rays III, 27 or 28; pectoral I, 15; teeth about 8 to 10+10 to 14.

Acanthurus glaucopareius (Bloch)

5b. No pale area below eye; lower posterior corner of operculum with a wide area or spot; lips and body blackish; a U-shaped band on lower side of chin extending up to maxillaries; in adults an oval light area, yellowish in alcohol, red in life, posteriorly on body and including spine on caudal peduncle, but this characteristic light area not developing until fish has reached a length of about 65 to 70 mm. (thus Günther's *A. aterrimus* becomes a synonym of *A. achilles*); along posterior base of soft dorsal and anal a pale line, blue in life, and on base of rays a narrow red band; margin of caudal fin yellowish (red in life), then a submarginal black band that follows outline of edges of entire caudal fin and encloses a central yellowish (red in life) area, absent on specimens 70 mm. and shorter; color in fins not appearing until a length of about 60 to 65 mm. is attained; dorsal rays IX, 30 to 34; anal III, 28 to 30; pectoral I, 16; teeth about 8 + 10; gill rakers 5 or 6 + 12 to 14.

Acanthurus achilles Shaw

4*b*. No white band or spot on posterior or lower angle of operculum.

6*a*. Sides of body with a pale ground color, often tinged with dusky purplish and crossed with five or six narrow blackish (dark purplish in life) vertical bands, first from occiput through eye, ending on lower edge of cheek; second from first dorsal spine to base of pectoral and continuing below a short distance in very young specimens; base of pectoral with a round black spot; third band from about between sixth and seventh dorsal spine to above anus; fourth band from fourth or fifth soft dorsal to front of anal; fifth band from about thirteenth or fourteenth soft dorsal to middle third of anal; last band or sixth in young may be a ring around caudal peduncle or only a pair of dots dorsally and ventrally on caudal peduncle; across base of caudal fin in very young specimens only is a black line and another near tips of fin rays, both of which disappear by the time a length of 30 mm. is reached; peritoneum black; dorsal rays about IX, 23; anal III, 20 or 21; pectoral I, 13 or 14; teeth 12 to 14 + 16 to 18; gill rakers 5 or 6 + 14 to 16.

Acanthurus triostegus (Linnaeus)

6*b*. Sides of body (head and trunk) without five or six vertical blackish lines or narrow bars on a background of pale color.

7*a*. Posterior third to half of rays of pectoral fin same color as anterior half to two-thirds of that fin.

8*a*. Caudal fin with a pale band posteriorly, becoming narrower on upper and lower lobes, then a diffuse brownish band grading into darker, followed by a submarginal black line that follows outer contour or caudal fin, color of basal three-fourths of caudal fin blackish, no light band inside black line in caudal fin; ground color of body blackish; a narrow pale area around spine on caudal peduncle; margin of dorsal and anal fins with a white line posteriorly and at base of rays of dorsal and anal fins a white line that expands posteriorly to include one-third of basal portion of last few rays; outer margin of pelvics with white line, rest of fin black; anus pale; dorsal rays IX, 28 to 31; anal III, 27; pectoral I, 15 or 16; gill rakers 5 + 12 or 13; teeth 8 or 9+ 10 to 12_Acanthurus rackliffei, new species

8*b*. Color of caudal fin not as in 8a.

9*a*. Head and trunk with about 11 sets of nearly longitudinal lines, each set consisting of a blue line, bordered above and below by a narrow black band, between each set a pale band (yellow or orange in life); band that passes through spine on caudal peduncle ends at base of caudal fin rays, but set of lines above and below this one turns at right angles on base of caudal fin and ends dorsally and ventrally, followed posteriorly by two transverse sets; other sets of bands continue on dorsal fin for a short distance, above which are several nearly parallel wavy pale streaks; lowermost band passes from mouth just below pectoral base to caudal fin base, area below this band uniform pale or dusky; anal fin with margin white, then a narrow submarginal black line, rest of fin dusky, base with a pale line; pelvics black-edged; caudal fin lunate, mostly blackish, but with a crescent-shaped pale line posteriorly; dorsal rays IX, 27 or 28; anal III, 26 to 28; pectoral 1, 15; teeth 12 to 14 + about 14; gill rakers about 5 + 11............**Acanthurus lineatus (Linnaeus)**

9b. Head and trunk not marked with definite color pattern of longitudinal lines or bands.

10a. Ground color sepia-brown, posterior half of body including dorsal and anal fins spotted with white; caudal fin not spotted with white, usually three (rarely four) vertical pale bars, first from occiput just behind eye to opercle, second from under spinous dorsal just behind pectoral base to belly, third (sometimes very faint) from front of soft dorsal to front of soft anal; sometimes a trace of a fourth from in front of spine on caudal peduncle to a point about two-thirds along base of anal; region below pectorals and breast pale; basal two-thirds of caudal fin pale, the distal third blackish or brownish, dorsal rays IX, 27 or 28; anal III, 24 or 25; pectorals I, 15; teeth about 10 + 12; gill rakers about 6 + 16.

Acanthurus guttatus Bloch

10b. Posterior part of trunk and of dorsal and anal fins without traces of numerous pale spots on a dark background of color.

11a. Base of caudal fin and including posterior part of caudal peduncle with a transverse pale band that extends posteriorly along dorsal and ventral edge of caudal fin base a distance equal to width of band at axis of peduncle, rest of caudal fin dusky, very near edge of that fin with a white line; ground color uniform grayish or dusky; upper lip blackish; outer rays of pelvics dusky or blackish; dorsal and anal more blackish than body, base of dorsal fin with a dusky line; no white transverse band behind eye and no black spots at bases of last rays of dorsal and anal fins, as in the type of *Teuthis leucoparcius*, and tip of pectoral rounded instead of pointed as in latter species; dorsal rays about IX, 26; anal III, 24; pectoral I, 16; teeth about 16+18; gill rakers about 5+13.

Acanthurus umbra (Jenkins)

11b. No transverse pale band across base of caudal fin or on caudal peduncle.

12a. Base of pectoral fin pale, also a pale horizontal band through eye; trunk with many fine, longitudinal, somewhat obscure, slaty lines; pale slaty-blue line along dorsal base; caudal slaty with blue spots; in alcohol dorsal and anal fins often show longitudinal lines too; dorsal rays IX, 25 to 27; anal III, 24 to 26; teeth 16 to 20+16 to 20; gill rakers 5+15 to 18. (After Günther and after Fowler.)

Acanthurus bariene Lesson

12b. Base of pectoral blackish and no pale band through eye; ground color blackish or grayish, often with numerous obscure dark purplish or dark bluish longitudinal lines, more obvious on paler specimens; vertical fins blacker than body, caudal fin with pale or white line posteriorly, wider in young and more

obvious; pectoral dusky but paler than body, its base color of body; peritoneum black; a black spot at bases of last dorsal and last anal rays, more evident in pale specimens 30 to 100 mm. but not so obvious and usually not distinguishable on black specimens 100 mm. and larger; dorsal rays IX, 24 or 25; anal rays III, 23 or 24; pectoral about I, 15; teeth about 10 to 12+14; gill rakers 5 or 6+14 to 16; the smaller specimens 30 to 100 mm. have a lunate caudal fin which becomes only concave at a length of 120 mm. and longer; specimens in pale phase of color have blackish lips and outer edges of dorsal and anal fins much darker than rest of body; some specimens with caudal peduncle paler than body.
Acanthurus elongatus (Lacepède)

7b. Posterior third to half of pectoral fin pale or golden colored, sharply contrasting with dusky or blackish half to two-thirds of that fin.

13*a*. An oblong white band bordered with jet black extending from a little back of eye a distance equal to length of pectoral; ground color of head and trunk blackish; pelvics, dorsal, and anal fins black; posterior one-third to one-half of pectoral fin pale, upper edge of pectoral pale too; caudal fin a little paler than body but brownish black, with faded blackish spots in lobes of fin, middle area of caudal fin posteriorly white, but very edge of white area has a black line; dorsal rays IX, 24; anal III, 23; pectoral I, 17, teeth about 18+20.
Acanthurus olivaceus Bloch

13*b*. No black-bordered white band extending a short distance back of eye, as in 13*a*.

14*a*. Posterior margin of caudal fin with a narrow white band, then a submarginal blackish line grading into dusky caudal fin; behind eye a jet-black band extending to over middle of length of pectoral fin; a jet-black lanceolate line extending anteriorly, from spine on caudal peduncle, a distance about equal to length of pectoral fin; ground color of head and trunk blackish, dorsal and anal fins as black as body near their bases but paler distally, margin of dorsal and anal fins with a narrow jet black band along their margins; posterior one-fourth to one-third of pectoral fin abruptly paler than blackish two-thirds to three-fourths of that fin; dorsal rays IX, 27; anal III, 24; pectoral I, 17; teeth 17+20---------- **Acanthurus nigricans (Linnaeus)**

14*b*. Posterior margin of caudal fin dusky or blackish, not white and sharply contrasting with darker color of rest of fin; ground color plain brownish or pale brownish; area around lower part of eye pale above and in front of orbit; basal two-thirds of pectoral dusky to brownish, the distal half to a third pale; pelvics dusky, edges dark brownish, central area of fin paler; dorsal and anal fins with about five or six alternating blackish and pale longitudinal bands along base of rays of dorsal, anal fin a pale streak, brilliant bluish in life, rather indistinct in alcoholic specimens; caudal fin at base a little lighter

than peduncle, central area posteriorly blackish, rear margin of caudal fin blackish (above color description is of specimens 165 and 175 mm. long). In a specimen 44 mm. long caudal fin at base abruptly paler than grayish body, distal half of caudal fin blackish; longitudinal bars in dorsal and anal fins barely visible, but margins of these fins more blackish than basal two-thirds; longitudinal stripes lacking in dorsal and anal of 425-mm. specimen, but at their bases a pale streak, blue in life. This large specimen was dark blue-green above when alive and paler below, in alcohol plain grayish; pectorals as in smaller specimens. Dorsal rays IX, 25 to 27; anal III, 24 or 25; pectoral I, 16; teeth about 15 or 16+16.
Acanthurus fuliginosus (Lesson)

3*b*. Dorsal spines IV or V.

15*a*. Ground color blackish or dark brown, with five or six pale transverse bands and parallel faint blackish lines, first band from just in front of dorsal fin through rear of orbit to base of pelvics, second from below spinous dorsal fin under pectoral to origin of anal, third, fourth, and fifth from dorsal to anal, sixth from dorsal just in front of caudal spine to anal fin; dorsal and anal fins with transverse pale lines posteriorly; head in front of eye with numerous small pale spots; peritoneum with many black pigment cells; dorsal rays about IV, 30 to 32; anal about III, 24; pectoral about I, 14; teeth 14+16 to 18_______**Zebrasoma veliferum (Bloch)**

15*b*. Ground color blackish or yellowish, with transverse bands; when ground color is blackish caudal spine is whitish, trunk with obscure wavy longitudinal bluish or grayish lines; pectoral plain pale, its upper edge with a black margin; snout somewhat produced but not so long as in *Z. rostratum*, pelvics, dorsal, caudal, and anal fins plain black; a short blue streak or pale band just above and extending behind pectoral, sometimes distinct and often not apparent; iris usually golden, yellow, or grayish; yellow phase not found here___________ **Zebrasoma flavescens (Bennett)**

1*b*. Tail armed with two immovable keeled bony bucklers or rigid spines, these often obscure in small specimens; teeth not crenulate at tips, as in 1*a*, but small and pointed, somewhat incisorlike; dorsal spines VI or VII.

16*a*. Caudal peduncle with two white areas around spines on caudal peduncle, meeting their fellows below, but absent on specimens of 55 to 60 mm.; ground color blackish; lips pale (yellow in life); vertical pale bar at rear of mouth, curving to front of eye; pelvic rays I, 2 or 3; very margin of soft dorsal with white line, then a black submarginal line, followed below by a white band, basal half of fin black; anal fin blackish with a marginal white line; rear margin of caudal fin white, rest of fin blackish; pectoral blackish except tips are paler; pelvics blackish; color of 55 to 60 mm. specimens about same as those over 100 mm. in length, except yellow mark from mouth to eye absent; no brown spots on sides of body as in young of *Naso unicornis;* dorsal rays VI or VII, 27 to 29; anal rays II, 29 or 30; pectoral I, 16 or 17; teeth about 25 to 27+21 to 23_______________ **Naso lituratus (Bloch)**

16*b*. Caudal peduncle without white areas around spines; no pale streak from mouth to eye.

17*a*. Ground color brownish black, sides with small rounded spots of deep violet-blue (blackish in alcohol), belly paler; lips blue; a streak below eye; dorsal dark brown, slightly bluish on spines, dusky on edge; anal dark brown with two dark blue streaks and a dusky edge; pelvics and pectoral dark brown; caudal blackish with a trace of a pale line at edge; length of specimen 109 mm., after Jordan and Seale and checked with specimen; dorsal rays about VI, 28; anal II, 28; pectoral I, 16______________ Naso brevirostris (Valenciennes)

17*b*. Ground color plain brownish, dorsal with a white marginal line, then a dark blue or blackish submarginal line, rest of fin light brown, anal similar to dorsal; in life dorsal and anal with oblique bluish streaks; three specimens about 60 mm. long plain pale brownish in alcohol, with three rows of large blackish spots, upper row faintest below and along base of dorsal with seven spots; one from above eye to caudal peduncle with seven spots and lower from behind eye to middle of caudal peduncle with five spots; a single spot occurs obliquely backward above base of pectoral; caudal, pectoral, and pelvic fins same color as body; dorsal fin with black blotches corresponding to rows of spots on body and area beyond these spots more or less a dusky band followed by a whitish line at margin; anal with a white marginal line, then a dusky to blackish submarginal streak fading into plain pale brownish color below; dorsal rays VI, 27 to 29; anal II, 28 or 29; pectoral I, 17__ Naso unicornis (Forskål)

Genus CTENOCHAETUS Gill

Ctenochaetus Gill, Proc. U. S. Nat. Mus., vol. 7, p. 279, 1884. (Type, *Acanthurus strigosus* Bennett.)

CTENOCHAETUS STRIGOSUS (Bennett)

Acanthurus strigosus Bennett, Zool. Journ., vol. 4, p. 41, 1828.

115160, Canton Island, lagoon, April 23–May 12, 1939, 1 specimen.

115158, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 16 specimens.

115157, Tutuila Island, reef at Alofau, June 3, 1939, 12 specimens.

115159, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 57 specimens.

115156, Tau Island, reef at Siulagi Point, June 27, 1939, 2 specimens.

115155, Rose Island, reef, June 11–14, 1939, 31 specimens.

115154, Rose Island, lagoon, June 12–20, 1939, 1 specimen.

115152, Hull Island, reef, July 13, 1939, 1 specimen.

115153, Hull Island, channel, July 7–17, 1939, 1 specimen.

52347, Apia, Samoa, Jordan and Kellogg, 12 specimens.

Genus ACANTHURUS Forskål

Acanthurus Forskål, Descriptiones animalium . . ., p. 59, 1775. (Type *Chaetodon sohal* Forskål, "later restricted by authors to the first species named, *Ch. unicornis*," according to Jordan and Evermann's "Genera of Fishes," p. 33.)

ACANTHURUS GLAUCOPAREIUS (Bloch)

Harpurus glaucopareius Bloch, *in* Schneider, Systema ichthyologiae . . ., p. 212, 1801.

115163, Rose Island reef, June 11–14, 1939, 5 specimens.

115164, Hull Island reef, July 2–15, 1939, 3 specimens.

115162, Hull Island channel, July 7–17, 1939, 4 specimens.
115165, Enderbury Island reef. May 15–19, 1939, 3 specimens.
115166, Hull Island reef, July 13, 1939, 6 specimens.
52505, Pago Pago, Samoa, Jordan and Kellogg, 3 specimens.

The following counts and measurements, expressed in hundredths of the standard length, were made on three specimens: 155, 157, and 70 mm., respectively; depth 58, 59.6, 61.0; head 31.4, 31.8; 35.3; snout 23.2, 24.8, 25.0; eye 8.1, 7.8, 10.9; mouth 6.2, 7.3, 7.4; postorbital part of head 4.8, 4.8, 5.0; least depth caudal peduncle 11.0, 11.0, 10.9; distance base last anal ray to base midrays caudal fin 11.0, 10.2, 10.7; length of caudal spine 11.0, 10.8, 7.1; interorbital 9.7, 10.1, 11.0; dorsal rays IX, 30; IX, 30; IX, 30. Anal rays III, 27; III, 27; III, 27. Pectoral rays I, 15; I, 15; I, 15. Gill rakers first arch 5+13; 5+13; 5+14. Teeth on upper and lower jaw 10+10; 10+12; 8+10.

ACANTHURUS ACHILLES Shaw

Acanthurus achilles SHAW, General zoology, vol. 4, p. 383, 1803.

115139, Swains Island reef, May 3–9, 1939, 16 specimens.
115140, Enderbury Island reef, May 15–19, 1939, 8 specimens.
115138, Hull Island reef, July 12–15, 1939, 2 specimens.
115141, Hull Island channel, July 7–17, 1939, 1 specimen.
115137, Rose Island reef, June 11–14, 1939, 20 specimens.
52475, Apia, Samoa, Jordan and Kellogg, 1 specimen.

A careful comparison of my numerous specimens of several sizes with plate 77 of Gunther's *Acanthurus aterrimus* indicates conclusively to me that it is a young specimen of this common species. With age the caudal fin becomes less lunate and the red caudal spot develops.

ACANTHURUS TRIOSTEGUS (Linnaeus)

Chaetodon triostegus LINNAEUS, Systema naturae, ed. 10, p. 463, 1758.

On May 24, 1939, in Canton Island lagoon, this species was in breeding colors. On males the margin of the anal was white; the vertical stripes were dark purple; margins of pelvics white; fins dusky, and the general background color olive green tinged with blackish. A gentle pressure on some of the males caused the milt to flow freely. During the next month females with almost ripe eggs were frequently found.

115151, Canton Island, lagoon, May 25–26, 1939, 1 specimen.
115128, Tau Island, reef at Siulagi Point, June 27, 1939, 6 specimens.
115116, Canton Island, lagoon, April 23 to May 12, 1939, 6 specimens.
115115, Canton Island, reef on ocean side, April 25–28, 1939, 37 specimens.
115114, Canton Island, reef in wide channel, May 13, 1939, 24 specimens.
115117, Canton Island, lagoon coral heads, May 23–25, 1939, 2 specimens.
115127, Swains Island reef, May 3–9, 1939, 7 specimens.
115124, Enderbury Island reef, May 15–19, 1939, 85 specimens.
115121, Tutuila Island, Fagasa Bay, rock pools, June 5, 1939, 2 specimens.

115122, Tutuila Island, reef at Alofau, June 3, 1939, 5 specimens.

115123, Tutuila Island, reef at Pagai, L. P. Schultz and Frank Taiga, June 4, 1939, 19 specimens.

115126, Rose Island, reef, June 11–14, 1939, 16 specimens.

115119, Hull Island, channel, July 8–12, 1939, 45 specimens.

115120, Hull Island reef, July 12–15, 1939, 22 specimens.

115118, Hull Island, channel, July 7–17, 1939, 7 specimens.

45086, Ellis Island, Samoa, Lord Lilford, 2 specimens.

52341, Apia, Samoa, Jordan and Kellogg, 7 specimens.

83273, Samoa, Wilkes Exploring Expedition, 1 specimen.

ACANTHURUS RACKLIFFEI, new species

FIGURE 13

Holotype.—A specimen (U.S.N.M. No. 115174; field number U-01059) 150 mm. in length from tip of snout to base of caudal fin rays, taken from a pool on the reef of Hull Island, July 14, 1939, by L. P. Schultz and Charles Rackliffe.

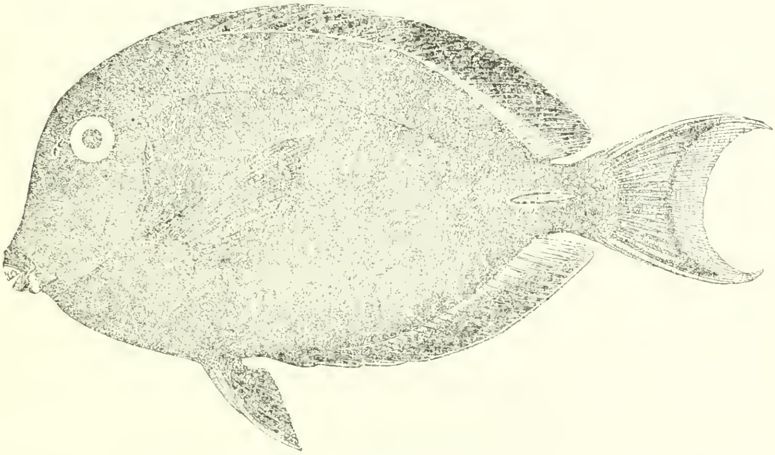

FIGURE 13.—*Acanthurus rackliffei*, new species: Holotype (U.S.N.M. 115174), 150 mm. in standard length.

Also, two paratypes were collected at Hull Island, one (U.S.N.M. No. 115175; field number U-01021) 161 mm. in standard length, taken July 13, 1939, at outer edge of reef, and the other (U.S.N.M. No. 115176) 67.8 mm. in standard length, from the channel leading from the ocean to the lagoon, July 7–17, 1939.

Description.—(Measurements and counts of the holotype are given first, and in the parentheses appear measurements and counts of the two paratypes, respectively. All measurements are expressed in hundredths of the standard length.) Length from tip of snout (teeth in this case) to base of caudal fin rays 150 (161; 67.8) mm. Greatest depth of body 59.3 (55; 61.8). Length of head, from tip of snout to upper edge of gill opening 30.9 (28; 36.2). Length of snout 23.6 (22.4; 24.5). Diameter (greatest) of eye 8.5 (7.3; 11.0).

Length of mouth, from tip of snout to rear of maxillary 6.6 (6.7; 8.0). Postorbital part of head 4.7 (5.2; 5.6). Length of longest pectoral fin ray 29.5 (28.5; 35.1). Length of longest dorsal spine 16.0 (14.9; 18.9). Length of longest dorsal soft ray 16.7 (16.1; 21.4). Length of longest caudal fin ray 30.0 (27.3, 34.5). Longest pelvic ray 21.3 (21.6; 23.9). Length middle caudal fin rays 18.7 (19.3; 22.4). Least depth of caudal peduncle 10.5 (10.8; 11.5). Length of caudal peduncle distance from base last anal ray to base of middle rays of caudal fin 10.7 (10.9; 12.1). Length of spine on caudal peduncle 10.3 (10.3; 7.1). Width of interorbital space 10.3 (10.4; 11.1). Length of base of anal fin 45.3 (44.7; 47.2). Length of base of dorsal fin 70.6 (72.1; 70.0).

Although the small specimen differs considerably in its measurements from the adults, it is thought that this is a result of size.

Dorsal rays IX, 28 (IX, 31; IX, 29). Anal rays III, 27 (III, 27; III, 26). Pectoral fin rays I, 15 (I, 16; I, 15). Pelvic rays I, 5 (I, 5; I, 5). Scales very small and the rows irregular but about 125 to 130 rows crossing side of body from upper edge of gill opening to base of caudal fin rays. Gill rakers on first gill arch 5+12 (5+13; 5+13). Number of teeth in upper and lower jaws 8+12 (9+10; 8+10).

Color (description based on holotype and paratypes): Ground color black; the spine on the caudal peduncle with a narrow pale area around it; the margin of the dorsal and anal fins with a white line, more distinct posteriorly; at base of rays of dorsal and anal fins is a white line that expands posteriorly to include one-third of the basal portion of the last few rays of these fins, dorsal and anal fins otherwise black; pectorals blackish; pelvics with a white line along their outer margin and rest of fin black; anus pale; U-shaped white band on lower half of jaw, this pale color ending on the posterior tips of maxillaries; caudal fin with pale band posteriorly, becoming narrower on upper and lower lobes, then a brownish diffuse band grading into darker, followed by a submarginal black line, color brownish on basal three-fourths of fin, grading in black at base of rays and on caudal peduncle. No light area below the eye and no white margin posteriorly on the opercle; no second submarginal pale band below the black line on the caudal fin, and the caudal fin not abruptly paler, greatly contrasting with the black caudal peduncle as in *A. glaucopareius*.

Remarks.—This species differs from all members of the genus *Acanthurus* in regard to the color pattern of the caudal fin, which has a pale marginal band and submarginal black line that follows the outline of the caudal fin posteriorly. It appears to be most closely related to *Acanthurus glaucopareius* and the young of *A. achilles* in its coloration, but the new species lacks the pale blotch below the eye and the white area or white margin posteriorly on the operculum; the caudal fin of *A. rackliffei* is dusky to blackish except the pale margin, while A. *glaucopareius* has a submarginal pale band below the submarginal blackish band, and the caudal fin at its base is abruptly pale or white; the adults of *A. achilles* have a large pale area, red in life, around the caudal spine, but lacking in this new species.

ACANTHURUS LINEATUS (Linnaeus)

Chaetodon lineatus LINNAEUS, Systema naturae, ed. 10, p. 274, 1758.

115133, Tau Island, reef at Siulagi Point, June 27, 1939, 2 specimens.

115130, Tutuila Island, reef at entrance to Pago Pago Bay, June 2, 1939, 4 specimens.

115129, Tutuila Island, Fagasa Bay, rock pools, June 5, 1939, 1 specimen.

115132, Enderbury Island, May 15–19, 1939, 4 specimens.

115131, Tutuila Island, reef at Alofau, June 3, 1939, 2 specimens.

15131, Samoan Islands, Col. A. B. Steinberger, 1 specimen.

52315, Apia, Samoa, Jordan and Kellogg, 11 specimens.

ACANTHURUS GUTTATUS Bloch

Acanthurus guttatus BLOCH, *in* Schneider, Systema ichthyologiae, p. 215, 1801.

115136, Swains Island reef, May 3–9, 1939, 10 specimens.

115134, Tau Island, reef at Siulagi Point, June 27, 1939, 12 specimens.

115135, Hull Island, channel, July 7–17, 1939, 1 specimen.

52321, Apia, Samoa, Jordan and Kellogg, 4 specimens.

ACANTHURUS UMBRA (Jenkins)

Teuthis umbra JENKINS, Bull. U. S. Bur. Fish., vol. 22 (No. 2), p. 477, 1903 (type locality: Honolulu). (Although I have not been able to find the type in the National Museum, a good figure of it occurs in Bull. U. S. Bur. Fish., vol. 23, pt. 1, pl. 47, 1905.)

115178, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 1 specimen.

ACANTHURUS BARIENE Lesson

Acanthurus bariene LESSON, Voyage autour du monde . . . *Coquille*, Zool., vol. 2, pt. 1, p. 150, 1830.

No specimens from the Phoenix or Samoan Islands in the National Museum.

ACANTHURUS ELONGATUS (Lacepède)

Chaetodon elongatus LACEPÈDE, Histoire naturelle des poissons, vol. 4, pp. 454, 473, fig., 1803.

In the use of this name I follow other authors, although Lacepède's description is of little value. My large series of specimens indicates that *A. lineolatus* is a synonym of *A. elongatus.* Günther's plate

73, figure A, appears to be a pale color phase of this species, and on these pale specimens the wavy blue lines are most prominent.

115150, Canton Island, reef on ocean side, April 25–28, 1939, 2 specimens.

115145, Swains Island reef, May 3–9, 1939, 11 specimens.

115149, Enderbury Island reef, May 15–19, 1939, 15 specimens.

115144, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 57 specimens.

115143, Tutuila Island, reef at Alofau, June 3, 1939, 13 specimens.

115142, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 10 specimens.

115146, Rose Island, reef, June 11–14, 1939, 84 specimens.

115148, Hull Island, reef, July 12–15, 1939, 6 specimens.

115147, Hull Island, channel, July 7–17, 1939, 14 specimens.

52340, Apia, Samoa, Jordan and Kellogg, 5 specimens.

52456, Apia, Samoa, Jordan and Kellogg, 2 specimens.

88070, Apia, Samoa, 1 specimen.

ACANTHURUS OLIVACEUS Bloch

Acanthurus nigricans var. *olivaceus* Bloch, *in* Schneider, Systema ichthyologiae . . ., pp. XXXVIII, 214, 1801.

115168, Rose Island, lagoon, June 12 to 20, 1939, 1 specimen.

52521, Apia, Samoa, Jordan and Kellogg, 2 specimens.

ACANTHURUS NIGRICANS (Linnaeus)

Chaetodon nigricans Linnaeus, Systema naturae, ed. 10, p. 274, 1758.

1115167, Canton Island, lagoon, April 23 to May 12, 1939, 1 specimen.

52496, Samoa, Jordan and Kellogg, 3 specimens.

ACANTHURUS FULIGINOSUS (Lesson)

Acanthurus fuliginosus Lesson, Voyage autour du monde . . . *Coquille*, Zool., vol. 2, pt. 1, p. 149, pl. 27, fig. 2, 1830.

115161, Canton Island, lagoon, May 25–26, 1939, 4 specimens, the largest one 425 mm.

52495, Apia, Samoa, Jordan and Kellogg, 6 specimens.

83274, Samoa, Wilkes Exploring Expedition, 1 specimen.

51759, type of *Hepatus aquilinus* Jordan and Seale, from Samoa.

Genus ZEBRASOMA Swainson

Zebrasoma Swainson, The natural history and classification of fishes, amphibians and reptiles, or monocardian animals, vol. 2, p. 256, 1839. (Type, *Acanthurus velifer* Bloch.)

ZEBRASOMA VELIFERUM (Bloch)

Acanthurus velifer Bloch, Naturgeschichte der ausländischen Fische, pt. 9, p. 106, pl. 427, fig. 1, 1795.

115172, Canton Island, lagoon, May 23–25, 1939, 4 specimens.

52350, Apia, Samoa, Jordan and Kellogg, 2 specimens.

ZEBRASOMA FLAVESCENS (Bennett)

Acanthurus flavescens BENNETT, Zool. Journ., vol. 4, p. 40, 1828.

I refer to *Z. flavescens* the specimens in the National Museum previously identified as *A. rhombeum* by Jordan and Seale and by Fowler.

115180, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 1 specimen.

52462, Apia, Samoa, Jordan and Kellogg, 2 specimens.

52507, Apia, Samoa, Jordan and Kellogg, 3 specimens.

Genus NASO Lacepède

Naso LACEPÈDE, Histoire Naturelle des Poissons, vol. 3, p. 105, 1802. (Type, *Chaetodon fronticornis* Linnaeus.)

NASO LITURATUS (Bloch)

Acanthurus lituratus BLOCH, *in* Schneider, Systema ichthyologiae . . ., p. 216, 1801.

115169, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 7 specimens.

115170, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 3 specimens.

115171, Rose Island reef, June 11–14, 1939, 6 specimens.

52450, Apia, Samoa, Jordan and Kellogg, 2 specimens.

NASO BREVIROSTRIS (Valenciennes)

Nasens brevirostris VALENCIENNES, *in* Cuvier and Valenciennes, Histoire Naturelle des poissons, vol. 10, p. 277, pl. 291, 1835.

52520, Apia, Samoa, Jordan and Kellogg, 1 specimen.

This specimen was reported upon by Jordan and Seale (1906) as *Acanthurus incipiens*. It is doubtful whether *N. annulatus* has been taken from this area.

NASO UNICORNIS (Forskål)

Chaetodon unicornis FORSKÅL, Descriptiones animalium . . ., pp. XII, 63, 1775.

115177, Rose Island, reef, June 11-14, 1939, 1 specimen.

52343, Apia, Samoa, Jordan and Kellogg, 2 specimens.

109565, Apia, Samoa, Jordan and Kellogg, 2 specimens.

Color in life, from note on the specimen from Rose Island reef: Head pale green, body pale olive, with dark gray spots in upper half of sides arranged in about two rows, three just behind operculum; a little below dorsal fin is an irregular row of dark olive-colored blotches; caudal peduncle darker olive; caudal fin with upper and lower rays dark olive, rest of fin pale green, except the whitish posterior margin; margin of dorsal with dark margin, and a row of blackish spots along its middle area the center of fin posteriorly reddish; anal fin dark red with a blackish-blue margin; a silvery area under head on side of breast.

Order CATAPHRACTI

Family SCORPAENIDAE

KEY TO THE GENERA AND SPECIES OF SCORPAENIDS FROM THE PHOENIX AND SAMOAN ISLANDS, REPRESENTED BY SPECIMENS IN THE NATIONAL MUSEUM (fig. 14)

1*a*. Dorsal spines greatly elongated, flexible, and much longer than head.

2*a*. Upper pectoral rays simple, greatly elongate, at least two times head.

3*a*. [Color in alcohol.] Caudal peduncle with a brownish longitudinal band along its midaxis; body with seven blackish or brownish bars, much wider than pale interspace, these black bars white bordered anteriorly; a long simple tentacle over each eye; membranes of pelvics blackish, rays white; upper pectoral rays white, elongate and threadlike, extending to or a little past the tip of the caudal fin; dorsal rays XII, 11; anal III, 6 or 7; pectoral 15 or 16; scales about 54 to 58; gill rakers about 4+1+10____________ **Pterois radiata Cuvier**

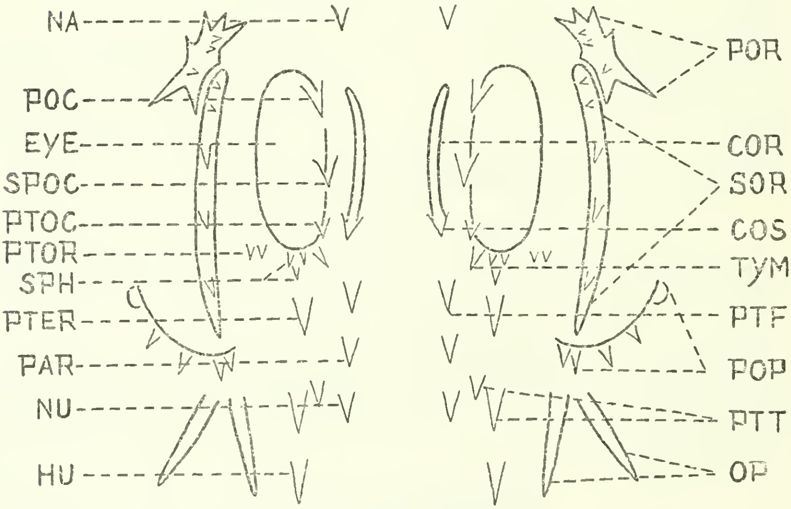

FIGURE 14.—Diagram of the upper part of the head of a scorpaenid, indicating the names given the various cranial spines referred to in the key to this group: *COR*, coronal ridge; *COS*, coronal spine; *HU*, humeral spine; *NA*, nasal spine; *NU*, nuchal spine; *OP*, opercular spines; *PAR*, parietal spines; *POC*, preocular spine; *POP*, preopercular spines; *POR*, preorbital spines; *PTER*, pterotic spine; *PTF*, postfrontal spines; *PTOC*, postocular spine; *PTOR*, postorbital spines; *PTT*, posttemporal spines; *SOR*, suborbital spines on the suborbital bones; *SPH*, sphenotic spines; *SPOC*, supraocular spine; *TYM*, tympanic spine.

TABLE 15.—*The number of pairs of cranial spines on certain scorpaenid fishes*

Genus and species	Nasal	Preocular	Supraocular	Postocular	Tympanic	Sphenotic	Pterotic	Posttemporal	Postfrontal	Suborbitals
Scorpaenodes guamensis.	1	1	1	1	1	2	1	1	Absent	3 or 4
Scorpaenodes parvipinnis.	1	1	1	1	1	2 or 3	1	1	Absent	7 or 8
Scorpaenopsis gibbosus	1	1	1	2 or 3	1	2	1	2	1	5 to 14
Scorpaenopsis novae-guinae.	1	1	1	1 or 2	1	2	1	2	1	4 or 5
Scorpaenopsis albobrunneus.	1	1	1	1	1	2 to 4 (weak)	1	2	Absent	3
Scorpaenopsis laotali	1	1	1	1	1	2	1	2	Absent	1
Scorpaenopsis asperella	1	1	1	1	1	1 or 2	1	2	Absent	3
Scorpaena nuchalis	1	1	1	1	1	3 to 5 (strong)	1	2	1	1

Genus and species	Preopercular	Parietal	Nuchal	Humeral	Coronal ridge	Coronal spine	Postorbitals	Preorbitals
Scorpaenodes guamensis	3	1	1	1	Absent	Absent	Absent	1 (weak)
Scorpaenodes parvipinnis	4	1	1	1	Weak	Present	Absent	1 (weak)
Scorpaenopsis gibbosus	4 or 5	1	1	1+2	Strong	Absent	2	Several
Scorpaenopsis novae-guinae	3	1	1	1	Strong	Absent	2	Few
Scorpaenopsis albobrunneus	5	1	1	1	Weak	Absent	Absent	Few
Scorpaenopsis laotali	5	1	1	1	Absent	Absent	Absent	Few
Scorpaenopsis asperella	4 or 5	1	1	1	Absent	Absent	Absent	Few
Scorpaena nuchalis	6	1	1	1	Strong	Absent	Absent	Few

TABLE 16.—*Counts made on certain species of scorpaenids from the Phoenix and Samoan Islands*

Genus and species	Number of fin rays													
	Dorsal						Anal		Pectoral					
	Spines		Soft rays				Spines	Soft rays	Upper rays			Lower simple rays		
	XII	XIII	8	9	10	11	III	5	6	7	8+9		10	11
Scorpaenodes guamensis	---	6	6	---	---	---	6	6	---	1	4	---	2	2
Scorpaenodes parvipinnis	---	1	---	1	---	---	1	1	1	---	---	---	---	1
Scorpaenopsis gibbosus	1	-----	---	1	---	---	1	1	1	---	---	---	---	1
Scorpaenopsis novae-guinae	1	-----	---	1	---	---	1	1	1	---	---	---	---	1
Scorpaenopsis albobrunneus	3	-----	---	3	---	---	3	3	2	1	---	2	1	--
Scorpaenopsis laotali	1	-----	---	1	---	---	1	1	1	---	---	1	---	---
Scorpaenopsis asperella	1	-----	---	1	---	---	1	1	1	---	---	---	1	---
Scorpaena nuchalis	4	-----	---	3	1	---	4	4	3	---	---	---	3	---

TABLE 16.—*Counts made on certain species of scorpaenids from the Phoenix and Samoan Islands*—Continued

Genus and species	Number of vertical scale rows along side of body													Number of gill rakers												
	Above lateral line													Above angle					At angle	Below angle						
	40	41	42	43	44	45	46	47	48	49	50	51	52	4	5	6	7	8+	1	+6	7	8	9	10	11	12
Scorpaenodes guamensis	1	--	--	1	--	--	--	--	--	--	--	--	--	--	4	3	--	--	7	3	4	--	--	--	--	--
Scorpaenodes parvipinnis	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	1	--	--	1	--	1	--	--	--	--	--
Scorpaenopsis gibbosus	1	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	1	--	--	1	--	--	--	--
Scorpaenopsis novae-guinae	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	1	--	--	1	--	--	1	--	--	--	--
Scorpaenopsis albobrunneus	--	--	--	--	--	--	--	--	1	--	--	--	2	--	2	1	--	--	3	--	--	--	--	--	2	1
Scorpaenopsis laotali	--	--	1	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	1	1	--	--	--	--	--	--
Scorpaenopsis asperella	--	--	--	1	--	--	--	--	--	--	--	--	--	--	1	--	--	--	1	1	--	--	--	--	--	--
Scorpaena nuchalis	--	--	--	--	4	--	--	--	--	--	--	--	--	3	--	--	--	--	4	--	--	--	1	1	2	--

3*b*. [Color in alcohol.] Caudal peduncle with vertical bars; head and body covered with numerous narrow alternating dark brown or black and white bars; above eye a long dermal flap; both rays and membranes of pelvic fins blackish; upper pectoral rays blackish, elongate and threadlike, extending to or past tip of caudal fin; dorsal rays XIII, 11 or 12; anal III, 7; pectoral 14 or 15; gill rakers about 5+1+11; scale rows about 102 to 109............ **Pterois volitans (Linnaeus)**

2*b*. Upper pectoral rays branched, shorter than middle rays, about 1⅓ longer than head; head with four or five brown bars and seven or eight more on body, interspaces pale; dorsal rays about XIII, 10; anal III, 6; pectoral about 17; gill rakers 5+1+10; scales about 52.
Dendrochirus brachypterus (Cuvier)

1*b*. Dorsal spines stiff and strong, usually shorter than head; pectoral rays not elongate and threadlike; usually not longer than head.

4*a*. Body covered with ctenoid scales.

5*a*. Dorsal spines XIII, one posttemporal spine; preorbital spines weak, mostly represented by bony projections where spines usually occur; no pit below eye; gill rakers 5 or 6+1+6 or 7.

6*a*. Dorsal spines much longer than diameter of eye; no scales extending upon soft rays of dorsal and anal fin; dorsal rays XIII, 8, rarely 9; anal III, 5; scales 40 to 43; pectoral with 18 or 19 rays, lower 10 or 11 rays simple; coronal ridge absent; suborbital with three or four spines; other pairs of cranial spines present are—nasal, preocular, supraocular, postocular, tympanic, two sphenotics, pterotic, one posttemporal, three preopercular, parietal, nuchal, humeral; preorbital with one blunt spine and two weak projections; usually a large blackish opercular blotch, and body crossed with about four brownish to black bars, fins and paler interspaces speckled and blotched with brown, underside of head plain brownish; cirri occur on preorbital, on ocular spines, on dorsal part of eye, on operculum, and a few along anterior part of lateral line; second anal spine longest and strongest, contained 1.5 to 2 times in head. (After measuring the length of the anal spines of most of the fishes listed in this report, I am convinced that the length of the anal spine is highly variable and if that is the only difference between *S. scaber* and *S. guamensis* then I refer *S. scaber* to the synonymy of *S. guamensis.*) _______ **Scorpaenodes guamensis (Quoy and Gaimard)**

6*b*. Dorsal spines short, about equal to diameter of eye; scales of body extending about halfway up on soft rays of dorsal fin, and more than one-fourth the way out on anal; body everywhere covered with strongly ctenoid scales or prickles, the latter on snout, eyes, and lower jaw, the lips smooth; dorsal rays XIII, 9; anal III, 5; scales 49; pectoral with 17 rays the lower 11 simple; gill rakers 6+1+7; coronal ridge prominent ending in a spine opposite supraorbital; suborbital with seven or eight spines; other pairs of cranial spines present are—nasal, preocular, supraocular, postocular, tympanic, two or three sphenotics, pterotic, one posttemporal, four preoperculars, parietal, nuchal, one humeral; preorbitals weak, with about one spine, the other projections rounded and blunt; color in alcohol, an obscure blackish spot below bases of second and third dorsal spines, a larger but less distinct blotch below fifth to seventh dorsal spines, then from base of eighth dorsal spine to base of next to last soft ray of dorsal a wide black band extending to ventral surface of body including base of anal fin, pale band across caudal peduncle followed by a narrow blackish band at base of rays of dorsal fin; lower lip with three black spots, upper lip with four or five black spots; sides of head with a few black spots; a black bar across middle of rays of pectoral fin; breast with a few blackish spots, a blackish spot above spine of cleithrum; two pale bands, separated by a narrow blackish one, below front of eye; scales ciliated____________________ **Scorpaenodes parvipinnis (Garrett)**

5*b*. Dorsal spines XII; two posttemporal spines on each side of head; preorbital with three to eight rather strong spines.

7*a*. Palatine teeth absent.

8*a*. A pit below eye; humeral spine with two spines extending outward along its length; 5 to 14 spines on suborbital; two small postorbital spines; other pairs of cranial spines present are—nasal, preocular, supraocular, postocular, tympanic absent, two sphenotics, pterotic, two posttemporal, postfrontal; four or five preoperculars, parietal, nuchal, three humerals; coronal ridge strong; preorbital with four groups of one or two spines each; scales about 40; gill rakers about 5+1+8; pectoral of about 17 rays, 11 lower ones simple.
Scorpaenopsis gibbosus (Bloch)

8*b*. No pit below eye; humeral spine without other spiny projections along its length.

9*a*. Postfrontal spine present; scale rows about 48; cranial spines forming tympanic, postocular, postfrontal more or less fused into a group of four or five spines; about four or five strong spines on suborbital; interorbital naked; numerous cirri of lower jaw, preorbital, maxillary, preopercle, and along lateral line; color brownish with blotches of paler on body and fins.
Scorpaenopsis novae-guinae (Cuvier)

9*b*. Postfrontal spine absent; palatine teeth present.

10*a*. Scales 48 to 52; two to four weak sphenotic spines; three suborbital spines; color brownish with rounded areas of pale or white anteriorly and dorsally, brown posteriorly forming two irregular bars, one on caudal peduncle and forward one extending from soft dorsal through middle of anal fin; another color phase is finely speckled with brown, and axil of

pectoral with small white spots; ocular tentacles as well as others usually present on related species small or lacking.
Scorpaenopsis albobrunneus (Günther)

10*b*. Scales about 43 or 44; 1 or 2 weak sphenotic spines.

11*a*. Supraocular tentacle small or lacking; suborbital ending in a spine but none along its length; cirri on preopercle, preorbital but none on the maxillary; no cirri on eye.
Scorpaenopsis laotali (Jordan and Seale)

11*b*. Supraocular tentacle as long as or a little longer than eye; three suborbital spines; tentacles on preopercle, preorbital and along lateral line; one or two cirri on maxillary; upper part of eye with three small cirri.
Scorpaenopsis asperella (Bennett)

7*b*. Palatine teeth present; postfrontal spine present; no pit below eye; scale rows about 44 (for other counts see table 16); usually a black blotch in spiny dorsal between seventh to eleventh spines, this blotch sometimes obscure; axil of pectoral with white blotches; tentacles on head more or less absent, those on ocular spines, preopercle, and preorbitals short; underside of body anteriorly with small pale spots; air bladder undeveloped.
Scorpaena nuchalis Günther

4*b*. Body without scales, skin usually with prickles; body much compressed, its greatest depth at least three times in its height; second and third dorsal spines highest, about same height as soft dorsal; no deep emargination between dorsal spines and soft rays, soft rays only a little longer than last few spines; tentacles on chin, lower jaw, snout, and over eye; following cranial spines are developed—nasal, preocular, supraocular, postocular, parietal, nuchal, one posttemporal, and humeral; suborbital and preorbital without definite spines; dorsal rays XII, 10; anal III, 6; pectoral 14 or 15; gill rakers about 6+1+12; color yellowish with blackish blotches or blackish______ Taenianotus triacanthus Lacepède

Genus PTEROIS Oken

Pterois Oken, *in* Cuvier, Règne animal, ed. 1, p. 286, 1817. (Type, *Scorpaena volitans* Bloch.)

PTEROIS RADIATA Cuvier

Pterois radiata Cuvier, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 4, 369, 1829.

115729, Rose Island, reef, June 11–14, 1939, 11 specimens.

115728, Swains Island, reef, May 3–9, 1939, 9 specimens.

115730, Canton Island, reef of widest shallow channel, May 13, 1939, 1 specimen.

52535, Apia, Samoa, Jordan and Kellog, 1 specimen.

PTEROIS VOLITANS (Linnaeus)

Gasterosteus volitans Linnaeus, Systema naturae, ed. 10, p. 296, 1758.

115727, Rose Island, lagoon, June 12 to 20, 1939, 1 specimen.

52334, Apia, Samoa, Jordan and Kellogg, 1 specimen.

Genus DENDROCHIRUS Swainson

Dendrochirus SWAINSON, The natural history and classification of fishes, amphibians and reptiles, or monocardian animals, vol. 2, p. 180, 1839. (Type, *Pterois zebra* Cuvier and Valenciennes.)

DENDROCHIRUS BRACHYPTERUS (Cuvier)

Pterois brachyptera CUVIER, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 4, p. 368, 1829.

51760 (2 types of *D. sausolele*), Apia, Samoa, Jordan and Kellogg.

Genus SCORPAENODES Bleeker

Scorpaenodes BLEEKER, Nat. Tijdschr. Ned.-Ind., vol. 13, p. 371, 1857. (Type, *Scorpaena polylepis* Bleeker.)

SCORPAENODES GUAMENSIS (Quoy and Gaimard)

Scorpaena guamensis QUOY and GAIMARD, Voyage autour du monde . . . *Uranie*, Zool., p. 326, 1824.

115707, Enderbury Island, reef, May 15–19, 1939, 1 specimen.
115708, Hull Island, channel, July 8–12, 1939, 1 specimen.
115709, Canton Island, reef at ocean, April 25–28, 1939, 1 specimen.
115715, Canton Island, lagoon, April 23 to May 12, 1939, 4 specimens.
115713, Canton Island, lagoon, May 23–25, 1939, 8 specimens.
115711, Swains Island, reef, May 3–9, 1939, 5 specimens.
115710, Tau Island, reef at Siulagi Point, June 27, 1939, 4 specimens.
115716, Tutuila Island, reef at Alofau, June 3, 1939, 7 specimens.
115714, Tutuila Island, rock pools at Fagasa Bay, June 5, 1939, 8 specimens.
115717, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 1 specimen.
115712, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 1 specimen.
52290, Apia, Samoa, Jordan and Kellogg, 9 specimens.
52293, Apia, Samoa, Jordan and Kellogg, 4 specimens.
15106, Samoan Islands, A. B. Steinberger, 1 specimen.
15136, Samoan Islands, A. B. Steinberger, 1 specimen.

SCORPAENODES PARVIPINNIS (Garrett)

Scorpaena parvipinnis GARRETT, Proc. California Acad. Sci., 1863, p. 105.

115706, Enderbury Island, reef, May 15–19, 1939, 1 specimen.

Genus SCORPAENOPSIS Heckel

Scorpaenopsis HECKEL, Ann. Wien. Mus., vol. 2, p. 158, 1837. (Type, *Scorpaena nesogallica* Cuvier and Valenciennes.)

SCORPAENOPSIS GIBBOSUS (Bloch)

Scorpaena gibbosa BLOCH, *in* Schneider, Systema ichthyologiae . . ., p. 192, pl. 44, 1801.

115718, Tutuila Island, reef at Alofau, June 3, 1939, 1 specimen.
52328, Pago Pago, Samoa, Jordon and Kellogg, 1 specimen.

SCORPAENOPSIS NOVAE-GUINEAE (Cuvier)

Scorpaena novae-guineae Cuvier, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 4, p. 320, 1829.

52468, Samoa, Jordan and Kellogg, 1 specimen.

SCORPAENOPSIS ALBOBRUNNEUS (Günther)

Scorpaena albo-brunnea Günther, Journ. Mus. Godeffroy, vols. 2–3, pts. 5–6, p. 77, 1874.

115720, Hull Island, channel, July 8–12, 1939, 1 specimen.
115719, Rose Island, reef, June 11–14, 1939, 1 specimen.
115721, Enderbury Island, reef, May 15–19, 1939, 1 specimen.

SCORPAENOPSIS LAOTALI (Jordan and Seale)

Sebastapistes laotale Jordan and Seale, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 376, fig. 72, 1906.

51761, Apia, Samoa, Jordan and Kellogg (6 types).

SCORPAENOPSIS ASPERELLA (Bennett)

Scorpaena asperella Bennett, Zool. Journ., vol. 4, p. 40, 1828.

45092, Samoa, Rev. S. G. Whitmee, 1 specimen.

Genus SCORPAENA Linnaeus

Scorpaena Linnaeus, Systema naturae, ed. 10, vol. 1, p. 266, 1758. (Type, *Scorpaena porcus* Linnaeus.)

SCORPAENA NUCHALIS Günther

Scorpaena nuchalis Günther, Journ. Mus. Godeffroy, vols. 2–3, pts. 5–6, p. 76, fig. (head above), 1874.

115725, Canton Island, lagoon, May 23–25, 1939, 2 specimens.
115724, Canton Island, reef at ocean, April 25–28, 1939, 5 specimens.
115723, Swains Island, reef, May 3–9, 1939, 4 specimens.
115726, Enderbury Island, reef, May 15–19, 1939, 28 specimens.
115722, Tau Island, reef at Siulagi Point, June 27, 1939, 8 specimens.

An examination of the type of *Sebastapistes corallicola* Jenkins indicates that it is essentially the same as the above-listed specimens of *S. nuchalis*, to which I refer it as a synonym.

Genus TAENIANOTUS Lacepède

Taenianotus Lacepède, Histoire naturelle des poissons, vol. 4, p. 303, 1803. (Type, *Taenianotus triacanthus* Lacepède.)

TAENIANOTUS TRIACANTHUS Lacepède

Taenianotus triacanthus Lacepède, Histoire naturelle des poissons, vol. 4, pp. 303, 306, 1803.

115731, Rose Island, lagoon, June 12 to 20, 1939, 1 specimen.
115733, Rose Island, reef, June 11 to 14, 1939, 1 specimen.
115732, Hull Island, reef, July 12–15, 1939, 1 specimen.

Family SYNANCEJIDAE

Genus SYNANCEJA Bloch

Synanceja BLOCH, in Schneider, Systema ichthyologiae . . ., p. 194, 1801. (Type, *Scorpaena horrida* Linnaeus.)

SYNANCEJA VERRUCOSA Bloch

Synanceja verrucosa BLOCH, in Schneider, Systema ichthyologiae . . ., p. 195, 1801.

115734, Tutuila Island, reef Alofau, June 3, 1939, 1 specimen.
52320, Apia, Samoa, Jordan and Kellogg, 3 specimens.

Family CARACANTHIDAE

KEY TO THE CARACANTHIDS FROM THE PHOENIX AND SAMOAN ISLANDS

1*a*. Preorbital with two short spines projecting forward from base of posteriorly projecting main spine; membrane of spinous dorsal fin connecting with first soft ray for over half the distance out from its base; eye about 4½ in head; dorsal rays VII, 13; anal II, 12; pectoral 6 + 7 or 8 (swollen) equals 13 or 14 rays; dorsal half of body brownish, ventral half pale.
Caracanthus unipinna (Gray)

1*b*. Preorbital with one short spine projecting forward from base of posteriorly projecting main spine; membrane between spinous and soft dorsals deeply notched, almost to base of first soft ray; eye about 3½ in head; dorsal rays VIII, 12; anal II, 11 or 12; pectoral 5 or 6 + 8 or 9 (swollen) rays; color grayish, upper sides, back and pectorals spotted with brown or blackish____________________________ Caracanthus maculatus (Gray)

Genus CARACANTHUS Kröyer

Caracanthus KRÖYER, Naturh. Tidsskr., vol. 1, p. 267, 1845. [Type, *C. typicus* Kröyer (= *Micropus maculatus* Gray).] Replaces *Micropus* Gray, preoccupied.

CARACANTHUS UNIPINNA (Gray)

Micropus unipinna GRAY, Zool. Misc., 1831, p. 20.

116082, Rose Island, reef, June 11-14, 1939, 66 specimens.
116081, Rose Island, lagoon, June 12 to 20, 1939, 2 specimens.
52253, Apia, Samoa, Jordan and Kellogg, 1 specimen.

CARACANTHUS MACULATUS (Gray)

Micropus maculatus GRAY, Zool. Misc., 1831, p. 20.

116079, Rose Island, reef June 11-14, 1939, 16 specimens.
116080, Enderbury Island, reef, May 15-19, 1939, 8 specimens.

Order CHROMIDES

Family POMACENTRIDAE

KEY TO THE GENERA AND SPECIES OF POMACENTRIDS FROM THE PHOENIX AND SAMOAN ISLANDS REPRESENTED BY SPECIMENS IN THE NATIONAL MUSEUM

1*a*. Scales 50 or more; opercle, interopercle, and sometimes subopercle with long spines radiating from the three bones; spines on interopercle and subopercle many times stronger than those on preopercle and of about same strength as on opercle; teeth in one row in both jaws, short and conic, with evident space between them at front of jaw; preopercle, preorbital, and suborbitals with small spines; dorsal rays X, 17; anal II, 14; scales about 52; pectoral about 18; gill rakers about 5 + 12; a pale dark bordered band from front of dorsal across opercular apparatus just touching rear of eye and ending on subopercle; caudal fin and caudal peduncle pale; a wide blackish or brown band from dorsal to anal fin leaving anterior lower part of body pale; pelvic and anal fins blackish; pectoral pale_________________________ **Amphiprion melanopus Bleeker**

1*b*. Scales fewer than 40; spines on opercle, if present, not appearing as if radiating from a common center but occurring as denticles along posterior margin.

2*a*. Teeth at front of jaw in two series, an outer row of short conical canines, rather widely spaced, inside of which is a narrow band of villiform teeth or an irregular series of small teeth.

3*a*. Preopercle serrated; caudal, soft dorsal, and anal fins scaled about two-thirds of the way out from bases; suborbitals free with denticles; preorbitals fully scaled; snout in front of nostrils with scales.

4*a*. Small denticles on suborbitals and preopercular, opercular, and interopercular margins; color consists of three vertical black bands one from front of dorsal through eye to mouth and on chin, the interorbital and lips pale; second from middle of base of spiny dorsal through pectoral base to pelvics; third from soft dorsal to soft anal; margin of dorsal blackish; pelvics blackish, caudal peduncle and fin pale______________ **Dascyllus aruanus (Linnaeus)**

4*b*. Preopercle and suborbitals with very fine denticles, opercle smooth; color in alcohol plain brown with a pale area at and a little above lateral line under 8 to 10 dorsal spines; anal, pelvics, and caudal fins somewhat blackish distally; spinous dorsal with margin blackish; black spot at upper edge of pectoral base; dorsal rays XII, 15; anal II, 14; pectoral about 20; scales 27; gill rakers 7 + 17. **Dascyllus trimaculatus (Rüppell)**

3*b*. Preopercle smooth; opercle and interopercle smooth; free edge of suborbitals absent or obscure, at most poorly defined, and without denticles; caudal fin scaled; preorbital scaled.

5*a*. No scales on soft dorsal or anal fins; snout in front of nostrils scaled; color in alcohol mostly plain grayish (in life bright blue), with a stripe from snout to eye; outer rays of caudal fin with blackish pigment, middle of fin pale; other fins plain pale; on lower sides of some specimens are pale areas, somewhat V-shaped but rather obscure markings; anal opening pale; peritoneum blackish; upper edge of pectoral base blackish; dorsal rays XII, 9 to 11 (usually 10); anal II, 9 or 10 (usually 10); scales about 25 or 26; gill rakers 8 to 10 + 22 to 24; color of a specimen in life (field No. U–39–520) body above brilliant bluish with purplish iridescent shade, darker above, paler below; base of pectoral blackish; upper and lower rays of caudal blackish; eye light bluish, margin of pupil yellow-orange_________________ **Chromis caeruleus (Cuvier)**

5*b*. Scales about two-thirds way out on soft dorsal and anal fins; snout scaled a little beyond nostrils; color in alcohol, posterior half of body and fins pale, anterior half plain brownish; pelvic fins brownish; pectorals pale; base of pectoral blackish or brown; dorsal rays XII, 13; anal II, 13____________ **Chromis dimidiatus (Klunzinger)**

2*b*. Teeth at front of jaws chiefly in one series, at least no well-defined group or band of small teeth just inside outer series.

6*a*. Scale rows about 35 on side of body; teeth short, conic, in a single row at front of jaws, rather widely spaced and not extending forward; posterior half of margin of orbit with short dermal papillae; color in alcohol, narrow vertical blackish bars along each scale row on upper half of body; in life the specimen was rose color ventrally, olive dorsally; depth 3½; dorsal rays XII, 14; anal II, 13; scales 35; gill rakers 8+18; lower sides and ventral region of head and body rose color (field No. U-39-100).

Lepidozygus tapeinosoma (Bleeker)

6*b*. Scale rows fewer than 32, usually from 23 to 30; no papillae on margin of orbit.

7*a*. Preopercle with posterior edge serrated; teeth incisor-like, close-set, forming a compact cutting edge; soft dorsal and soft anal rays about 1/2 scaled (table 18). (*Pomacentrus.*)

8*a*. Dorsal spines XIII, rarely XII.

9*a*. Dorsal posterior angle or flap of opercle with a black spot; suborbital mostly naked or wholly naked, its lower edge with spines; at front of suborbital above rear edge of maxillary occurs a spine, pointing posteriorly, much stronger than any other spine on suborbital; scales on snout occurring forward as far as nostrils.

10*a*. Dorsal rays XIII, 12; anal II, 13; each scale with vertical oblong pale band meeting its fellow above and below to form alternating vertical pale, then brown, lines; no black spot on pectoral base; no black spot at rear base of soft dorsal; anus blackish; head with blue lengthwise lines.

Pomacentrus pavo (Bloch)

10*b*. Dorsal rays XIII, 15; anal II, 16; each scale with small pale spots that form nearly vertical brown lines along each scale row; pale spots not joining with those of adjacent scales; upper base of pectoral with a black spot, a white-bordered black spot at rear base of soft dorsal fin; pelvics brownish; anus same color as body.

Pomacentrus vaiuli Jordan and Seale

9*b*. No black spot on opercle; body and fins plain brown or blackish; suborbitals scaly without spines on young and only indications of them on adults 100 mm. or more long; snout scaled to in front of nostrils; preorbital (that part in front of eye above maxillaries) with a few scales posteriorly; anus same color as body; pelvics blackish.

11*a*. Dorsal rays XIII, 14; anal II, 14; teeth essentially in one row, large outer row with a few small ones posteriorly between the large ones, these small teeth not in a band behind outer row; whole base of pectoral blackish.

Pomacentrus melanopterus Bleeker

11*b*. Dorsal rays XIII, 16; anal II, 13; teeth in one row without any small ones between the large ones; upper edge of pectoral base black____________ **Pomacentrus inornatus** De Vis

8*b*. Dorsal spines XII, rarely XIII.

12*a*. Anus very black; upper pectoral base black; body pale, yellowish in alcohol; nearly vertical, blackish lines at each row of scales; no spot on dorsal or anal fins; pelvics pale as body;

dorsal rays XII, 16; anal II, 12, suborbitals with weak spines (in very small specimens these spines are undeveloped); snout and suborbitals scaled, but preorbital from eye to maxillaries naked, its least depth about 1/2 eye; upper edge of caudal peduncle just beyond soft dorsal with a black area or saddle.
Pomacentrus aureus Fowler

12*b*. Anus same color as body; color plain brown or blackish; pelvics dusky or blackish, no black spot on dorsal edge of caudal peduncle; suborbitals spiny and scaled; preorbital naked, except a scale or two posteriorly.

13*a*. Preorbital wide, its least width equal to eye; scales on snout barely reach to nostrils; upper pectoral base without a black spot; rear base of soft dorsal without a black spot; dorsal rays XII, 15; anal II, 13.
Pomacentrus lividus (Bloch)

13*b*. Preorbital narrower, its least width at rear corner of maxillaries about one-half to two-thirds eye in adults; scales on snout occurring in front of line between nostrils; upper pectoral base with a black spot.

14*a*. Body plain black; usually a black spot visible at rear base of soft dorsal but sometimes obscure because body and fins are as black as the spot; no white in front of spot and no white band across body; dorsal rays XII, 15 to 17 (usually 16); anal II, 12 or 13 (usually 13) (suborbital spines rather weak in this species in small ones).
Pomacentrus nigricans (Lacepède)

14*b*. Dorsal rays XII, 14 or 15; anal II, 11 to 13 (usually 12); color plain blackish either with an obscure wide pale band across body or a black spot, white bordered anteriorly.

15*a*. Black spot, bordered with white or pale anteriorly, at rear base of soft dorsal.
Pomacentrus albofasciatus eclipticus Jordan and Seale

15*b*. Black spot at rear base of soft dorsal without white area; pale vertical band across rear half of body somewhat obscure in some specimens; an obscure narrow blackish band from front of spiny dorsal ventrally past axil of pectoral fin, visible even when pale band is lacking.
Pomacentrus albofasciatus albofasciatus Schlegel and Müller

7*b*. Preopercle with posterior edge not serrated; teeth incisorlike (table 19) (*Abudefduf*).

16*a*. Dorsal spines XIII.

17*a*. Dorsal soft rays 15 or 16 and with a color pattern of six vertical black bars, sometimes not very distinct, but never a black ocellated spot near base of last four dorsal spines; anal rays II, 14 or 15; from 3½ to 4 scales from end of lateral line to base of dorsal fin on body; suborbitals with a few scales posteriorly, always naked anteriorly; teeth uniserial, without small ones between the larger ones; snout not scaled forward to opposite nostrils; preorbital naked; upper base of pectoral with a black spot; no black spot on rear base of soft dorsal but a black spot on upper edge of caudal peduncle just behind base of soft dorsal; anus colored like body.
Abudefduf sordidus (Forskål)

17*b*. Dorsal soft rays usually 11 to 13; if more soft rays present color pattern not consisting of six vertical black bars combined with a black spot on upper edge of caudal peduncle next to rear base of soft dorsal.

18*a*. No black spot at upper edge of base of caudal fin.

19*a*. A large, black, ocellated spot near base of last four dorsal spines nearly reaching lateral line, and at rear base of soft dorsal fin a small black spot with some of pigment on dorsal edge of caudal peduncle; body otherwise plain brown; small black spot at upper base of pectoral fin; a blue line extending from snout past upper edge of eye along anterior base of dorsal but this line lacking on two specimens; teeth in one row, chiefly, with small ones on inner side between the larger outer ones; suborbital, preorbital, and preopercular edges all naked, top of head not scaled forward to opposite nostrils; anus somewhat dusky or same color as body; 1½ to 2 scales above end of lateral line on body; dorsal rays 12 to 14; anal II, 12 or 13.

Abudefduf biocellatus (Quoy and Gaimard)

19*b*. No black ocellated spot near base of last four dorsal spines.

20*a*. Body plain pale gray or blue in life, anus black and sharply contrasting with color of body; no black spots at upper edge of pectoral base or on rear base of soft dorsal fin; caudal peduncle without black spots; lower sides with faint inverted V-shaped pale areas, sometimes obscure or absent; young with a brilliant blue line from tip of snout past upper edge of eye along base of dorsal but this fading out and disappearing on specimens longer than about 30 to 40 mm. in standard length; suborbital, preorbital, and preopercular edges naked; top of head not quite scaled to between nostrils; about 1½ scales between lateral line and base of dorsal fin on body; teeth chiefly in one row, but smaller teeth on inside between larger outer series; dorsal rays XIII, 11 or 12, anal II, 12; gill rakers about 7+13

Abudefduf glaucus (Cuvier)

20*b*. Body not colored as in 20*a*, anus about same color as body in that area.

21*a*. Five or six vertical blackish bars on sides of body, these about as wide as pale interspaces; no definite black spot or saddle on dorsal edge of caudal peduncle except as black bar continues dorsally; teeth uniserial, no small inner teeth between large teeth; dorsal rays XIII, 12 or 13; anal II, 11 or 12; gill rakers about 6 or 7+13 or 14.

22*a*. Upper and lower lobes of caudal fin brownish, middle of this fin pale; suborbitals, preorbitals, and preopercular edge scaled; top of head scaled in front of nostrils; five black bars, fading on lower sides on body; upper pectoral base blackish; at end of lateral line three scales between it and base of dorsal fin

Abudefduf sexfasciatus (Lacepède)

22*b*. Upper and lower lobes of caudal fin not differently pigmented than rest of fin; 3½ or 4 scales above end of lateral line.

23*a*. Five black bars on side of body; suborbitals scaled (on young of these species scales are not developed); preopercular edge scaled; preorbitals naked; top of head scaled to between nostrils.
Abudefduf saxatilis (Linnaeus)

23*b*. Six black bars on side of body; suborbitals scaled posteriorly; preorbitals and preopercular edge naked; top of head scaled only forward to least interorbital distance.
Abudefduf septemfasciatus (Cuvier)

21*b*. Body not consisting of black bars with pale interspaces of about same width; if bars occur they are white on a generally black background.

24*a*. Preorbitals (area in front of eye from rear edge of maxillary forward) scaled; suborbitals and preopercular edge scaled; top of head scaled forward in front of nostrils; teeth uniserial, rather large and few in number; no black spot at rear of soft dorsal, but a black spot at upper base of pectoral; two scales above end of lateral line; color light brown, paler below; outer rays of anal dusky; dorsal rays XIII, 12; anal II, 13.
Abudefduf curacao (Bloch)

24*b*. Preorbitals, suborbitals, and preopercular edge naked; teeth in one row, with smaller teeth inside and between larger ones.

25*a*. Opercle with a pale spot; ground color usually blackish or brownish with one or two pale bars on body, seldom obscure; 1 to 1½ scales above end of lateral line.

26*a*. Color plain brown or blackish with a wide pale bar on side of body under last half of pectoral fin; no black spot at upper base of pectoral, as pectoral base is same color as body; a black spot at rear base of soft dorsal extending a little on caudal peduncle but becoming obscure after a standard length of 45 mm. is reached; a black spot at rear base of spiny dorsal, also disappearing at the same size; basal two-thirds of caudal fin brown, rest pale; top of head not quite scaled to opposite nostrils; dorsal rays XIII, 12 or 13; anal II, 13; gill rakers 8 or 9+14 or 15______ **Abudefduf zonatus** (Cuvier)

26*b*. Body blackish with two narrow pale bars, one at tips of pectoral fin and the other across front of caudal peduncle, these bars, at least the one under tips of pectoral, sometimes faint or obscure; pale opercular spot prominent, with a blackish margin on opercle; base of pectoral dusky like body; no spot at rear base of soft dorsal; caudal fin with pale band across middle

two-thirds, base black and tips dusky; top of head scaled forward to almost opposite nostrils.
Abudefduf amabilis (De Vis)

25*b*. Opercle without pale spot; color grayish blue or blackish (blue in life) without pale bars on body; edge of dorsal fin blackish, middle pale, base blackish in males, whole fin pale in females; anal pale, edge blackish in males; a black band extending from snout through eyes; whole base of pectoral more blackish than body; a large prominent black spot at rear base of soft dorsal but not extending on dorsal edge of caudal peduncle; tips of first rays of pelvics filamentous, and blackish, rest of fin pale to dusky; one-half or one scale above end of lateral line.
Abudefduf taupou Jordan and Seale

18*b*. A black spot at dorsal edge of base of caudal fin, prominent at all ages; opercle with a pale area; a blue streak from snout past dorsal edge of eye, then wider behind eye as it passes along base of dorsal and surrounds a black spot near base of last three or four dorsal spines; a black spot at rear base of soft dorsal, often obscure or lacking on adult specimens but prominent on young, this spot extending on caudal peduncle a little, the blue streak meeting its fellow behind this black spot on upper edge of caudal peduncle; one and one-half to two scales above end of lateral line; suborbitals, preorbitals, and preopercular edge naked; top of head not scaled to opposite nostrils; upper pectoral base pale; anus colored like body; dorsal rays XIII, 12; anal II, 12------------------- **Abudefduf leucopomus** (Cuvier)

16*b*. Dorsal spines XII.

27*a*. Dorsal soft rays 11; anal II, 11; suborbitals and preopercular edge sealed; preorbital scaled posteriorly; top of head scaled to almost opposite nostrils; whole base of pectoral blackish; rear base of soft dorsal and dorsal side of caudal peduncle without black spot; caudal fin emarginate, upper and lower rays filamentous, blackish in contrast to pale middle rays; color dark brown or blackish, fins dark, margin of soft dorsal and anal blackish; teeth chiefly in one row, with small inner teeth between the larger ones-- **Abudefduf filamentosus** (Macleay)

27*b*. Dorsal soft rays 15 to 18, rarely 14.

28*a*. Color not plain, but with one or more distinct white or black vertical bars on sides of body; dorsal rays XII, 17 or 18; anal II, 13 or 14; 2 to 2½ scales above end of lateral line.

29*a*. Ground color blackish with four pale vertical bars, one past opercle made up of large pale spots, next under middle of length of pectoral fin, third from end of spiny dorsal to anal, and last from behind rear base of soft dorsal to same position of soft anal fins; upper edge of caudal peduncle black where black band encircles it; caudal fin pale or yellowish, distally colorless; no spot at rear of soft dorsal or on base of pectoral fin; anus colored like body; teeth uniserial projecting forward; suborbital and preopercular

edge scaled; preorbital scaled posteriorly; top of head scaled a little forward of nostrils.
Abudefduf phoenixensis, new species

29*b*. Ground color light brown or pale, with a black bar from soft dorsal to soft anal and extending on anal fin and base of soft dorsal; no spot at base of pectoral dorsally or on rear base of soft dorsal; anus a little duskier than body; caudal fin and peduncle pale, contrasting with darker body; teeth uniserial, projecting forward; suborbital and preopercular edge scaled; preorbital with a few scales posteriorly; top of head scaled a little forward of nostrils.
Abudefduf dickii (Liénard)

28*b*. Color plain pale to blackish or brownish without black or pale vertical bars; dorsal rays XII, 15 or 16; teeth uniserial, somewhat projecting forward.

30*a*. Suborbitals scaled; preopercular edge scaled ventrally at least; two to three scales above end of lateral line; color of body brown or blackish; upper base of pectoral black; pelvics blackish; caudal fin dark like body; anus colored like body.

31*a*. Color plain brown or blackish without blue or pale spots; no spot at rear base of soft dorsal; top of head scaled forward to a little in front of nostrils; preorbital mostly naked possibly a scale posteriorly; dorsal rays XII, 15 or 16; anal II, 12_________ **Abudefduf behni** (Bleeker)

31*b*. Color plain brown, upper part of body (bright blue in life) with scattered pale spots, obscure in alcohol, in young a small brown spot occurring at rear base of soft dorsal; top of head scaled to opposite nostrils; a scale or two posteriorly on preorbitals; dorsal rays XII, 15 or 16; anal II, 13.
Abudefduf lacrymatus (Quoy and Gaimard)

30*b*. Suborbitals, preorbitals, and preopercular edge all naked; two scales above end of lateral line; dorsal rays XII, 15; anal II, 11; color of body plain pale in alcohol; upper base of pectoral pale, no black spot; pelvics pale; top of head scaled to opposite nostrils; caudal fin pale like body__ **Abudefduf imparipennis** (Vaillant and Sauvage)

Genus AMPHIPRION Bloch

Amphiprion Bloch, *in* Schneider, Systema ichthyologiae . . ., p. 200, 1801. (Type, *Lutjanus ephippium* Bloch.)

AMPHIPRION MELANOPUS Bleeker

Amphiprion melanopus Bleeker, Nat. Tijdschr. Ned. Ind., vol. 3, p. 561, 1852.

52289, Apia, Samoa, Jordan and Kellogg, 3 specimens.

Genus DASCYLLUS Cuvier

Dascyllus Cuvier, Règne animal, vol. 2, p. 179, 1829. (Type, *Chaetodon aruanus* Linnaeus.)

DASCYLLUS ARUANUS (Linnaeus)

Chaetodon aruanus Linnaeus, Systema naturae, ed. 10, p. 275, 1758.

115857, Tutuila Island, reef at Alofau, June 3, 1939, 10 specimens.

115856, Rose Island, lagoon, June 12 to 20, 1939, 15 specimens.

115860, Tutiula Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 12 specimens.

115859, Canton Island, lagoon, May 23 to 25, 1939, 14 specimens.

115858, Canton Island, lagoon, April 23 to May 12, 1939, 13 specimens.

52204, Apia, Samoa, Jordan and Kellogg, 38 specimens.

20513, Samoan Islands, A. B. Steinberger, 29 specimens.

Table 17.—*Fin-ray counts made on species of* Dascyllus *and* Chromis

Species	Dorsal								Anal						
	Spines	Soft rays							Spines	Soft rays					
	XII	9	10	11	12	13	14	15	II	9	10	11	12	13	14
Dascyllus aruanus	4			1	3				4			2	2		
Dascyllus trimaculatus	1							1	1						1
Chromis caeruleus	10	2	7	1					10	3	7				

DASCYLLUS TRIMACULATUS (Rüppell)

Pomacentrus trimaculatus Rüppell, Atlas zu der Reise im nordlichen Afrika, Fische, p. 39, pl. 8, fig. 3, 1828.

52208, Pago Pago, Samoa, Jordan and Kellogg, 1 specimen.

Genus CHROMIS Cuvier

Chromis Cuvier, Mém. Mus. Hist. Nat. Paris, vol. 1, p. 393, 1815. (Type, *Sparus chromis* Linnaeus.)

CHROMIS CAERULEUS (Cuvier)

Heliases caeruleus Cuvier, Histoire naturelle des poissons, vol. 5, p. 454, 1830.

115865, Rose Island, lagoon, June 12 to 20, 1939, 4 specimens.

115864, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 12 specimens.

115863, Canton Island, lagoon, April 23 to May 12, 1939, 7 specimens.

115862, Canton Island, lagoon, May 23 to 25, 1939, 118 specimens.

15116, Samoan Islands, A. B. Steinberger, 6 specimens.

52332, Pago Pago, Samoa, Jordan and Kellog, 23 specimens.

CHROMIS DIMIDIATUS (Klunzinger)

Heliastes dimidiatus Klunzinger, Verh. zool.-bot. Ges. Wien, vol. 21, p. 529, 1871.

51743 (2 types of *Chromis iomelas* Jordan and Seale), Apia, Samoa, Jordan and Kellogg.

Genus LEPIDOZYGUS Günther

Lepidozygus Günther, Catalogue of the fishes of the British Museum, vol. 4, p. 15, 1862. (Type, *Pomacentrus tapeinosoma* Bleeker.)

LEPIDOZYGUS TAPEINOSOMA (Bleeker)

Pomacentrus tapeinosoma Bleeker, Nat. Tijdschr. Ned. Ind., vol. 10, p. 376, 1856.

115861, McKean Island, from mouth of *Lutianus bohar* caught off reef, April 30, 1939, 1 specimen.

Genus POMACENTRUS Lacepède

Pomacentrus Lacepède, Histoire naturelle des poissons, vol. 4, p. 505, 1803. (Type, *Chaetodon pavo* Bloch.)

Table 18.—*Fin-ray counts made on certain species of* Pomacentrus *from the Phoenix and Samoan Islands*

Species	Dorsal								Anal						
	Spines		Soft rays						Spines	Soft rays					
	XII	XIII	12	13	14	15	16	17	II	11	12	13	14	15	16
nigricans	27					4	20	3	18		4	17			
albofasciatus albofasciatus	32					23	3		17		15	2			
albofasciatus eclipticus	18				2	16			12	1	11				
tividus	6					6			6			6			
inornatus		3					3		3		1	2			
pavo		3	2	1					3			3			
aureus	4						4		3		3				
vaiuli		3				3			3						3
melanopterus		1			1				1				1		

POMACENTRUS PAVO (Bloch)

Chaetodon pavo Bloch, Naturgeschichte der auslandischen Fische, pt. 3, p. 6, pl. 198, 1787.

115835, Hull Island, channel, July 8–12, 1939, 1 specimen.

115836, Canton Island, lagoon, May 23 to 25, 1939, 4 specimens.

52309, Apia, Samoa, Jordan and Kellogg, 12 specimens.

POMACENTRUS VAIULI Jordan and Seale

Pomacentrus vaiuli Jordan and Seale, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 280, pl. 40, fig. 2, 1906.

115854, Tutuila Island, reef at entrance to Pago Pago Bay, June 2, 1939, 1 specimen.

51740 (6 types of *Pomacentrus vaiuli* Jordan and Seale), Apia, Samoa, Jordan and Kellogg.

POMACENTRUS MELANOPTERUS Bleeker

Pomacentrus melanopterus Bleeker, Nat. Tijdschr. Ned. Ind., vol. 3, p. 562, 1852.

52305, Apia, Samoa, Jordan and Kellogg, 5 specimens.

POMACENTRUS INORNATUS De Vis

Pomacentrus niomatus (typographical error for *inornatus*) De Vis, Proc. Linn. Soc. New South Wales, vol. 8, p. 451, 1883.

115834, Swains Island, reef, May 3–9, 1939, 1 specimen.

52291, Apia, Samoa, Jordan and Kellogg, 2 specimens.

POMACENTRUS AUREUS Fowler

Pomacentrus aureus Fowler, B. P. Bishop Mus. Bull. 38, p. 22, fig. 3, 1927.

115847, Enderbury Island, reef, May 15–19, 1939, 43 specimens.

115844, Canton Island, reef of the widest shallow channel, May 13, 1939, 5 specimens.

115845, Hull Island, reef, July 12–15, 1939, 5 specimens.

115846, Hull Island, channel, July 7–17, 1939, 9 specimens.

POMACENTRUS LIVIDUS (Bloch)

Chaetodon lividus Bloch, *in* Schneider, Systema ichthyologiae . . ., p. 235, 1801.

52376, Apia, Samoa, Jordan and Kellogg, 10 specimens.

POMACENTRUS NIGRICANS (Lacepède)

Holocentrus nigricans Lacepède, Histoire Naturelle des poissons, vol. 4, pp. 332, 367, 1803.

115841, Canton Island, lagoon, May 23–25, 1939, 13 specimens.

115843, Canton Island, lagoon, April 23 to May 12, 1939, 13 specimens.

115839, Hull Island, channel, July 7–17, 1939, 1 specimen.

115840, Enderbury Island, reef, May 15–19, 1939, 3 specimens.

115837, Canton Island, reef of widest shallow channel, May 13, 1938, 2 specimens.

115388, Canton Island, lagoon, May 25–26, 1939, 2 specimens.

115842, Canton Island, seined in channel and lagoon, April 24, 1939, 1 specimen.

52430, Pago Pago, Samoa, Jordan and Kellogg, 20 specimens.

45091, Samoa, Rev. S. G. Whitmee, 1 specimen.

POMACENTRUS ALBOFASCIATUS ECLIPTICUS Jordan and Seale

Pomacentrus eclipticus Jordan and Seale, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 282, fig. 50, 1906.

115828, Canton Island, lagoon, April 23 to May 12, 1939, 47 specimens.

115829, Canton Island, lagoon, May 23–25, 1939, 78 specimens.

115830, Canton Island, reef at ocean, April 25–28, 1939, 8 specimens.

115827, Hull Island, reef, July 12–15, 1939, 14 specimens.

115826, Hull Island, channel, July 8–12, 1939, 41 specimens.

115831, Canton Island, reef of widest shallow channel, May 13, 1939, 20 specimens.

115832, Hull Island, channel, July 7–17, 1939, 8 specimens.

51739 (9 types of *Pomacentrus eclipticus* Jordan and Seale), Apia, Samoa, Jordan and Kellogg.

118024, Samoan Islands, A. B. Steinberger, 2 specimens.

41561, Samoan Islands, Dr. C. H. White, U. S. N., 1 specimen.

POMACENTRUS ALBOFASCIATUS ALBOFASCIATUS Schlegel and Müller

Pomacentrus albofasciatus Schlegel and Müller, Verh. Nat. Gesch. Zool. Leiden, vol. 2, p. 21, 1839–44.

115850, Swains Island, reef, May 3–9, 1939, 2 specimens.

115848, Canton Island, lagoon, May 23–25, 1939, 1 specimen.

115849, Tutuila Island, rock pools, Fagasa Bay, June 5, 1939, 1 specimen.

115852, Canton Island, lagoon, May 25–26, 1939, 10 specimens.

115851, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 18 specimens.

115853, Tutuila Island, reef at Alofau, June 3, 1939, 100 specimens.

52401, Pago Pago, Samoa, Jordan and Kellogg, 25 specimens.

POMACENTRUS ALBOFASCIATUS: ALBOFASCIATUS × ECLIPTICUS

The following specimens are intergrades between *P. a. eclipticus* and *P. a. albofasciatus:*

115823, Rose Island, reef, June 11–14, 1939, 9 specimens.

115824, Canton Island, lagoon, May 25–26, 1939, 4 specimens.

115825, Tau Island, reef at Siulagi Pt., June 27, 1939, 5 specimens.

115821, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 39 specimens.

115822, Tutuila Island, reef at Alofau, June 3, 1939, 14 specimens.

Genus ABUDEFDUF Forskål

Abu-defduf Forskål, Descriptiones animalium . . ., p. 59, 1775. (Type, *Chaetodon sordidus* Forskål.)

ABUDEFDUF SORDIDUS (Forskål)

Chaetodon sordidus Forskål, Descriptiones animalium . . ., pp. xxiii, 62, 1775.

115762, Tutuila Island, Fagasa Bay, rock pools, June 5, 1939, 6 specimens.

115761, Swains Island, reef, May 3–9, 1939, 10 specimens.

Table 19.—*Fin-ray counts made on certain species of* Abudefduf *from the Phoenix and Samoan Islands*

Species	Dorsal									Anal					
	Spines		Soft rays							Spines	Soft rays				
	XII	XIII	11	12	13	14	15	16	17	II	11	12	13	14	15
sordidus		4					3	1		4				3	1
septemfasciatus		5		3	2					4		4			
saxatilis		2		1	1					2	1	1			
sexfasciatus		2		1	1					2		2			
glaucus		6	2	4						3		3			
behni	2						1	1		2		2			
imparipennis	14						14			13	12	1			
zonatus		5		1	4					5			5		
amabilis		8		8						8		8			
dickii	3								3	3				3	
taupou		6	2	4						5		3	2		
biocellatus		8		1	6	1				7		2	5		
filamentosus	3		3							3	3				
leucopomus		5		5						4		4			
lacrymatus	2						1	1		2			2		
curacao		3		3						3			3		
phoenixensis	5								5	5			2	3	

115760, Canton Island, seined in channel and lagoon, April 24, 1939, 6 specimens.

115765, Canton Island, reef at ocean, April 25–28, 1939, 6 specimens.

115758, Rose Island, lagoon, June 12 to 20, 1939, 2 specimens.

115763, Tau Island, reef at Siulagi Pt., June 27, 1939, 11 specimens.

115766, Hull Island, channel, July 7–17, 1939, 1 specimen.

115759, Tutuila Island, reef at Alofau, June 3, 1939, 11 specimens.

115764, Hull Island, reef, July 12–15, 1939, 8 specimens.

115767, Enderbury Island, reef, May 15–19, 1939, 23 specimens.
115768, Hull Island, channel, July 8–12, 1939, 5 specimens.
52448, Apia, Samoa, Jordan and Kellogg, 4 speciments.

ABUDEFDUF BIOCELLATUS (Quoy and Gaimard)

Glyphisodon biocellatus QUOY and GAIMARD, Voyage autour du monde . . . *Uranie*, Zool., p. 389, Jan. 29–May 26, 1825.

115820, Tutuila Island, reef at Alofau, June 3, 1939, 1 specimen.
115818, Tutuila Island, Fagasa Bay, rock pools, June 5, 1939, 1 specimen.
52281, Apia, Samoa, Jordan and Kellogg, 11 specimens.
15117, Samoan Islands, A. B. Steinberger, 4 specimens.
88060, Pago Pago, Samoa, Jordan and Kellogg, 1 specimen, 23 mm.

The specimen 23 mm. in standard length differs from the others listed above in having XIII, 15 dorsal rays and no blue lines on upper part of head. One other specimen also lacked these blue lines. Otherwise these specimens correspond with the others.

Although Herre[17] and other authors consider *A. biocellatus* and *A. zonatus* the same species, I have separated these two forms in this study because I do not believe their evidence is absolutely conclusive. I can find no intergradation of color patterns.

ABUDEFDUF GLAUCUS (Cuvier)

Glyphisodon glaucus CUVIER, Histoire naturelle des poissons, vol. 5, p. 475, 1830.

115806, Swains Island, reef, May 3–9, 1939, 138 specimens.
115807, Canton Island, lagoon, May 25–26, 1939, 1 specimen.
115803, Rose Island, reef, June 11–14, 1939, 32 specimens.
115802, Canton Island, reef of the widest shallow channel, May 13, 1939, 158 specimens.
115798, Tutuila Island, reef at Alofau, June 3, 1939, 32 specimens.
115812, Canton Island, lagoon, May 23–25, 1939, 37 specimens.
115808, Hull Island, reef, July 12–15, 1939, 86 specimens.
115810, Canton Island, reef at ocean, April 25–28, 1939, 158 specimens.
115811, Hull Island, channel, July 8–12, 1939, 288 specimens.
115,799, Rose Island, lagoon, June 12 to 20, 1939, 2 specimens.
115801, Tutuila Island, Fagasa Bay, rock pools, June 5, 1939, 20 specimens.
115804, Tau Island, reef at Siulagi Point, June 27, 1939, 48 specimens.
115805, Hull Island, shallow tide pool, July 13, 1939, 6 specimens.
115809, Canton Island, lagoon, April 23 to May 12, 1939, 2 specimens.
115800, Hull Island, channel, July 7–17, 1939, 8 specimens.
52474, Apia, Samoa, Jordan and Kellogg, 19 specimens.

Color in life: Body and upper fins brilliant blue, undersides paler, color fading as soon as the fish dies.

ABUDEFDUF SEXFASCIATUS (Lacepède)

Labrus sexfasciatus (Commerson) LACEPÈDE, Histoire naturelle des poissons, vol. 3, pp. 430, 477, pl. 19, fig. 2, 1802.

52405, Apia, Samoa, Jordan and Kellogg, 11 specimens.

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[17] Field Mus. Nat. Hist., Zool. ser., vol. 21, p. 299, 1936.

ABUDEFDUF SAXATILIS (Linnaeus)

Chaetodon saxatilis Linnaeus, Systema naturae, ed. 10, p. 276, 1758.

52220, Apia, Samoa, Jordan and Kellogg, 1 specimen.
88064, Apia, Samoa, Jordan and Kellogg, 1 specimen.

ABUDEFDUF SEPTEMFASCIATUS (Cuvier)

Glyphisodon septemfasciatus Cuvier, Histoire naturelle des poissons, vol. 5, p. 463, 1830.

115815, Hull Island, channel, July 8–12, 1939, 3 specimens.
115817, Swains Island, reef, May 3–9, 1939, 6 specimens.
115816, Canton Island, reef of the widest shallow channel, May 13, 1939, 3 specimens.
115818, Canton Island, lagoon, April 23 to May 12, 1939, 1 specimen.
52429, Apia, Samoa, Jordan and Kellogg, 4 specimens.

Scales on suborbitals not present as shown on plate 409, figure 5, in Bleeker's Atlas.

ABUDEFDUF CURACAO (Bloch)

Chaetodon curacao Bloch, Naturgeschichte der ausländischen Fische, pt. 3, p. (79) 106, pl. 212, fig. 1, 1787.

52218, Apia, Samoa, Jordan and Kellogg, 7 specimens.

ABUDEFDUF ZONATUS (Cuvier)

Glyphisodon zonatus Cuvier, Histoire naturelle des poissons, vol. 5, p. 483, 1830.

115813, Tutuila Island, reef at Alofau, June 3, 1939, 23 specimens.
115814, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 12 specimens.
52195, Apia, Samoa, Jordan and Kellogg, 13 specimens.

ABUDEFDUF AMABILIS (De Vis)

Glyphisodon amabilis De Vis, Proc. Linn. Soc. New South Wales, vol. 8, p. 452, 1883.

115781, Enderbury Island, reef, May 15–19, 1939, 19 specimens.
115780, Hull Island, reef, July 12–15, 1939, 6 specimens.
115779, Hull Island, channel, July 7–17, 1939, 7 specimens.
52300, Apia, Samoa, Jordan and Kellogg, 42 specimens.

In life the opercle had a bright yellow spot bordered by a wavy blue line posteriorly. At Hull Island some of the specimens lacked the bar on the side of the body, and the one on the caudal peduncle was very faint.

ABUDEFDUF TAUPOU Jordan and Seale

Abudefduf taupou Jordan and Seale, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 288, pl. 43, fig. 3, 1906.

115769, Rose Island, reef, June 11–14, 1939, 74 specimens.
115770, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 13 specimens.
115771, Rose Island, lagoon, June 12–20, 1939, 11 specimens.

51741 (5 types of *Abudefduf taupou* Jordan and Seale), Apia, Samoa, Jordan and Kellogg.

15112, Samoan Islands, A. B. Steinberger, 1 specimen.

Color in life (field No. U–39–516): Dorsal spines brilliant orange; soft dorsal and caudal translucent; lower anterior portion of caudal with tinge of orange; anal dull orange; lower half of body dull orange; pelvic spine orange, the prolonged tip blackish; jet-black spot at base of soft dorsal; body on sides and back brilliant dark purple; pectorals colorless.

In Bleeker's Atlas, plate 410, figure 6, does not represent the same species as in Günther's "Fishe der Südsee," plate 128, figure A. The latter is a male of *Abudefduf taupou.* Jordan and Seale's plate 43, figures 2 and 3, represents *A. taupou*, figure 2 a male and figure 3 a female.

ABUDEFDUF LEUCOPOMUS (Cuvier)

Glyphisodon leucopomus Cuvier, Histoire naturelle des poissons, vol. 5, p. 480, 1830.

115797, Canton Island, reef at ocean, April 25–28, 1939, 16 specimens.
115793, Hull Island, reef, July 12–15, 1939, 7 specimens.
115795, Hull Island, channel, July 7–17, 1939, 8 specimens.
115794, Hull Island, reef, July 13, 1939, 9 specimens.
115792, Tutuila Island, Fagasa Bay, rock pools, June 5, 1939. 3 specimens.
115796, Tau Island, reef, at Siulagi Pt., June 27, 1939, 69 specimens.
52306, Apia, Samoa, Jordan and Kellogg, 16 specimens.

Color in life, from color crayon sketch (field No. U–39–97): Sides of body and head dark olive, as is dorsal region in front of spiny dorsal fin; opercle with yellow area; dazzling blue band from snout past dorsal edge of eye, thence along base of dorsal fin, meeting its fellow on upper edge of caudal peduncle; a black spot near base of last three dorsal spines; a second black spot at rear base of dorsal fin and extending on caudal peduncle, behind which the blue streak ends; the third black spot is at upper base caudal fin and a trifle on peduncle; basal three-fourths or more of anal yellow, the outer margin black; pelvic, pectoral, and caudal fins yellow; outer two-thirds of dorsal fins yellow-orange; lower lip black.

ABUDEFDUF FILAMENTOSUS (Macleay)

Glyphidodon filamentosus Macleay, Proc. Linn. Soc. New South Wales, vol. 7, p. 365, 1882.

51742 (6 types of *Abudefduf metallicus* Jordan and Seale), Apia, Samoa, Jordan and Kellogg.

118025, Samoan Islands, Dr. C. H. White, 2 specimens.

ABUDEFDUF PHOENIXENSIS, new species

FIGURE 15.

Abudefduf albofasciatus (not Hombron and Jacquinot) FOWLER and BALL, B. P. Bishop Mus. Bull. 26, p. 22, 1925.—FOWLER, B. P. Bishop Mus. Mem., vol. 10, p. 324, fig. 56, 1928.

Holotype.—A specimen (U.S.N.M. No. 115782) 52.5 mm. in standard length, taken by Leonard P. Schultz on the reef of Enderbury Island, May 15–19, 1939, along with 44 paratypes (U.S.N.M. No. 115785), 32 to 57.5 mm., same data.

In addition the following paratypes were collected: U.S.N.M. No. 115784, Rose Island reef, June 11–14, 1939, 13 specimens, 28–49 mm.; U.S.N.M. No. 115783, Hull Island channel, July 7–17, 1939, 3 specimens, 32–35 mm.; U.S.N.M. No. 115786, Swains Island reef, May 3–9, 1939, 9 specimens, 22–48 mm.

Description.—(Based on the holotype and 69 paratypes, listed above. Detailed counts and measurements were made on the holotype and three paratypes, one each from Enderbury, Rose, and Swains Islands. The data for the holotype are given first, followed by that for the paratypes in parentheses, respectively. All measurements are expressed in hundredths of the standard length, 52.5 mm. [53.5; 43.7; 44.6]). Length of head 32.7 (34.0; 33.6; 33.6); greatest depth of body 55.3 (56.1; 51.5; 50.5); length of snout 10.1 (11.2; 10.8; 10.1); diameter of eye 10.3 (9.9; 10.1; 10.6); distance from tip of snout to posterior edge of maxillary 9.9 (10.3; 10.1; 9.9); distance from tip of snout to origin of dorsal fin 44.8 (46.2; 43.5; 47.0); snout to origin of anal fin 62.8 (68.2; 66.5; 67.2); snout to insertion of pelvic fins 40.0 (40.2; 41.2; 41.5); distance from posterior base of anal fin to mid-base of caudal fin 19.0 (18.1; 17.9; 16.4); least depth of caudal peduncle 16.7 (16.8; 16.7; 15.7); length of longest ray of pectoral fin 29.0 (31.0; 27.9; 31.0); length of longest ray of pelvic fin 26.1 (31.8; 33.6; 34.8); length of longest ray of upper lobe of caudal fin 30.9 (33.6; 34.3; 36.2) and of lower one 28.0 (30.0; 31.0; 32.5); length of longest (usually 7 or 8) dorsal spine 17.5 (19.7; 19.5; 17.9); length of longest soft ray of dorsal 21.5 (21.5; 24.5; 21.3); length of longest soft ray of anal 21.5 (25.8; 28.1; 24.6); length of last dorsal spine 17.2 (18.7; 18.3; 17.9); length of second anal spine 18.1 (17.4; 19.2; 20.2); length of base of soft dorsal fin 25.6 (28.6; 25.2; 23.1); length of base of anal fin 24.8 (26.2; 29.3; 24.6); length of base of dorsal fin 60.0 (62.9; 61.4; 58.2); postorbital length of head 16.2 (15.9; 16.2; 16.4); interorbital space 10.5 (11.2; 10.3; 10.1); width of preorbital (distance from above rear edge maxillary to eye 5.1 (5.6; 4.6; 4.5).

Dorsal rays XII, 17 (XII, 16; XII, 17); anal rays II, 14 (II, 14; II, 14; II, 14); scale rows on side of body from upper edge of gill opening to base of caudal fin 30 (29; 30; 29); number of scales in lateral line 22 (22; 23; 21); number of scales above end of lateral line 2½ (2; 2; 2); number of scales from origin of anal fin upward and backward to lateral line 9 (9; 9; 9); the gill rakers were counted as follows, all rudiments included —— (6?+11; 4+11; 5+10), these rakers are very short.

The teeth are compressed, close-set, and uniserial and project forward; the top of the head is scaled forward to opposite the nostrils; there are three rows of scales on the cheek, and in addition the preopercular edge is scaled; the suborbitals are scaled, and this scalation extends forward so that one or two scales occur on the posterior part of the preorbital region, the remainder being naked.

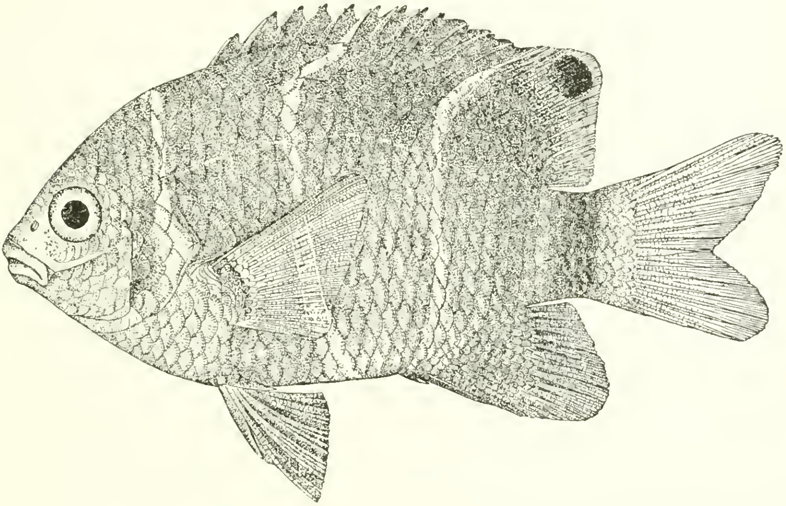

FIGURE 15.—*Abudefduf phoenixensis*, new species: Holotype (U.S.N.M. No. 115782), 52.5 mm. in standard length.

The ground color is blackish with a brownish tinge (in alcohol), with four vertical white bars about one scale wide; the first white bar begins about five scales in front of the dorsal origin and extends across the opercle, where it is often made up of large white spots; the second commences on the dorsal fin between the fifth and sixth dorsal spine and extends downward under middle of length of pectoral fin to just in front of the anus; the third white bar begins on the dorsal fin between the first to third soft rays and extends to middle of base of anal fin; sometimes broken up into round pale spots ventrally; the last white bar on the caudal peduncle reaches from just behind the base of the last dorsal soft ray to same position behind soft anal; the entire caudal fin is pale; thus a wide black bar occurs on the caudal peduncle, ending at base of caudal fin rays; the suborbitals have a row of pale spots, and two more rows occur on the cheeks; the snout and lower jaw are grayish; from the ventral part of the second white bar, along each row of scales posteriorly are pale spots; these pale spots occur on each scale of the anal fin basally; the dorsal and posterior margin of the soft dorsal fin white; pectoral fin paler than body; pelvics blackish; near the tips of the longest rays of the soft dorsal is a black spot; the smallest specimen, 22 mm. in standard length, has the same general color pattern as the larger ones, but the third white bar on the dorsal fin has posteriorly a black ocellated spot; the white of this third bar curves around the black spot, this ocellated spot covering the first to ninth soft rays of the dorsal fin; there is no black spot near the tips of the dorsal soft rays, as in larger specimens.

Remarks.—This new species resembles most closely in color *Glyphisodon albofasciatus* Hombron and Jacquinot [15] but differs from it and all other species in coloration. It is separated from other species of the Phoenix and Samoan Islands by the key that I have prepared for this family.

Abudefduf phoenixensis differs from *A. albofasciatus* (Hombron and Jacquinot) in having XII, 16 or 17 dorsal rays and II, 13 or 14 anal rays instead of XIII, 17 or 18 dorsal and II, 12, anal rays. In addition, there are only three white bands on the side of the body of *A. albofasciatus* instead of four as in *A. phoenixensis;* the black color of the caudal peduncle extends halfway out on the caudal fin of the former and not at all on the new species; there are no black spots on the soft dorsal fin in the figure of *A. albofasciatus.*

In Bleeker's Atlas, plate 405, figure 6, of *Glyphidodontops albofasciatus*, are shown four white bars and a basal black spot in the soft dorsal; this figure has XIII, 12 dorsal and II, 13 anal rays, unlike the new species. Bleeker's figure shows a black spot distally at the tips of the midcaudal fin rays, a white streak across the anal fin, and white spots on top of the head, all lacking in the new species.

Although these figures may be incorrect in regard to fin-ray counts, there are so many other differences it seems best to describe the present form as a new species, based on specimens known to have been taken from Enderbury, Hull, Swains, Rose, Johnson, and Wake Islands.

Named *phoenixensis* in reference to the group of Phoenix Islands where it was taken in great numbers.

ABUDEFDUF DICKII (Liénard)

Glyphisodon dickii Liénard, 10^{me} Rapp. Ann. Soc. Hist. Nat. Maurice, p. 35, 1839.

115787, Hull Island, channel, July 7–17, 1939, 2 specimens.
115789, Hull Island, reef, July 12–15, 1939, 2 specimens.
115791, Hull Island, channel, July 8–12, 1939, 1 specimen.

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[15] Voyage au Pôle Sud. . . . *Astrolabe,* vol. 3, pl. 5, fig. 4, 1853.

115788, Rose Island, reef, June 11–14, 1939, 2 specimens.
115790, Canton Island, lagoon, May 23–25, 1939, 1 specimen.
52406, Apia, Samoa, Jordon and Kellogg, 3 specimens.

When alive (color notes from color crayon sketch made in field) all of body was light brown, except caudal fin and peduncle which were orange with a white bar across base of fin, and tips of caudal fin rays were colorless; a black bar extends from soft dorsal base to base of soft anal; dorsal fin light brown except posteriorly purplish; basal half of anal purplish, middle brown, margin with a black band; base of pelvics purple, tips blackish; base of pectoral yellow, rest of fin pale or colorless; upper margin of eye black.

ABUDEFDUF BEHNI (Bleeker)

Glyphisodon behni Bleeker, Verh. Batav. Genootsch. (Labr. Cten.), vol. 21, p. 25, 1846–47.

52285, Pago Pago, Samoa, Jordan and Kellogg, 1 specimen.

ABUDEFDUF LACRYMATUS (Quoy and Gaimard)

Glyphisodon lacrymatus Quoy and Gaimard, Voyage autour du monde . . . *Uranie*, Zool., p. 388, pl. 62, fig. 7, 1825.

52206, Pago Pago, Samoa, Jordan and Kellogg, 1 specimen.
15107, Samoan Islands, A. B. Steinberger, 1 specimen.

The three small specimens (U.S.N.M. No. 15107) identified by Fowler and Bean in U. S. Nat. Mus. Bull. 100, vol. 7, p. 147, as *Abudefduf unimaculatus* cannot be that species as they have XII dorsal spines. One I refer to *A. lacrymatus* and the other two to *P. a. eclipticus.* It is probable that *A. unimaculatus* does not occur among the Samoan Islands.

ABUDEFDUF IMPARIPENNIS (Vaillant and Sauvage)

Glyphisodon imparipennis Vaillant and Sauvage, Rev. Mag. Zool., ser. 3, vol. 3, p. 279, 1875.

115774, Swains Island, reef, May 3–9, 1939, 22 specimens.
115778, Rose Island, reef, June 11–14, 1939, 24 specimens.
115773, Hull Island, reef, July 12–15, 1939, 14 specimens.
115775, Hull Island, channel, July 8–12, 1939, 4 specimens.
115772, Hull Island, channel, July 7–17, 1939, 6 specimens.
115777, Canton Island, reef at ocean, April 25–28, 1939, 12 specimens.
115776, Enderbury Island, reef, May 15–19, 1939, 33 specimens.
50703 (type of *Chromis elaphrus* Jenkins), Honolulu, also referred to this species.

Order PHARYNGOGNATHI

Family LABRIDAE

KEY TO THE GENERA OF LABRIDAE REPORTED FROM THE PHOENIX AND SAMOAN ISLANDS, BASED ON SPECIMENS IN THE NATIONAL MUSEUM

1*a*. Snout produced, somewhat tubular, its length about 1½ times postorbital length of head; length of lower jaw shorter than head; scales large, about 27 or 28 rows from upper edge of gill opening to base of caudal fin rays; lateral line continuous, with abrupt downward bend posteriorly;

dorsal spines VIII; gill membranes attached to isthmus with narrow fold; head mostly naked, sometimes a few scales at upper angle of operculum; free edge of preopercle not continued forward ventrally ending at curve of lower corner; no canines near corners of upper jaw; pectoral fin rays about 15; one pair of canines at symphyses of upper and lower jaws------ **Gomphosus** Lacepède

1*b*. Snout not produced or tubular; shorter than postorbital length of head.

2*a*. Bones of lower jaw as long as head, extending backward below isthmus; scales large about 19 or 20 rows on sides of body; lateral line interrupted, posteriorly, continuing again on midside of caudal region; dorsal rays IX, 10; anal III, 8; gill membranes free from isthmus but forming a wide fold across it; head scaled; free edge of preopercle continuing far forward ventrally in front of lower corner; no canines near corner of upper jaw; pectoral rays about 11; gill rakers about 5+11; one pair of canines at symphyses of upper and lower jaws. **Epibulus** Cuvier

2*b*. Lower jaw shorter than head, upper jaw shorter than snout.

3*a*. Head so fully scaled that there is no free edge to preopercle; underside of head scaled, gill membranes joined across isthmus so that there is no groove forward; snout naked; scales large about 26 to 28 rows on sides; gill membranes attached to isthmus with only a trace of a fold across it; lateral line continuous, bent downward posteriorly; dorsal rays IX, 11 or 12; anal III, 10 or 11; strong canine at corner of upper jaw; gill rakers feebly developed, about nine on lower part of first arch; pectoral rays about 13-- **Labrichthys** Bleeker

3*b*. Preopercle with a free edge posteriorly and at least free around lower corner.

4*a*. Scales large, numbering about 20 to 29 rows from upper edge of gill opening to base of caudal fin rays.

5*a*. Gill membranes not attached to isthmus but with a wide free fold across it; lateral line interrupted posteriorly continuing again on midaxis of caudal region; no canines near corner of upper jaw; dorsal spines IX (rarely X except on *chlorourus*); preopercle with free edge posteriorly and ventrally.

6*a*. Head scaly at least on sides (these scales become embedded in specimens 3 feet long or more).

7*a*. One pair of canines at symphyses of upper and lower jaws, without recurved outer pairs in upper jaw; pectoral rays about 11; dorsal rays IX or X, 9 to 11; scale rows 20 or 21; gill rakers 5 to 8+5 to 12; first anal spine enlarged about two-thirds length of second ------ **Cheilinus** Lacepède

7*b*. No canines at symphyses of jaws but small teeth, with canines each side of symphysis, pair on upper jaw long, curved outward and backward; gill rakers about 5+9; pectoral rays 15 or 16; dorsal rays IX, 11; scale rows about 25. **Pseudocheilinus** Bleeker

6*b*. Head naked, no scales even on upper part of operculum; scale rows about 25 or 26; dorsal rays IX, 12; gill rakers about 7+11; pectoral rays about 12; a pair of canines at symphyses of upper and lower jaws------ **Novaculichthys** Bleeker

5*b*. Gill membranes attached to isthmus, with or without a narrow free fold across it.

8*a*. Dorsal spines VIII, soft rays usually 13; lateral line continuous with an abrupt bend posteriorly on caudal region; gill membranes attached to isthmus with a narrow free fold across it; no canines at corner of upper jaw; free edge of preopercle ending as it curves forward at lower corner; head mostly naked but sometimes with a patch of scales on upper part of operculum; gill rakers about 8 to 11 + 11 to 14; pectoral rays usually 15; scales 26 to 28; one pair of canines at symphyses of upper and lower jaws_______________ Thalassoma Swainson

8b. Dorsal spines IX.

- *9a*. Lateral line interrupted posteriorly, continuing again on midaxis of caudal region; lower pharyngeal with a larger median tooth and a tiny one at each side of it, and extending forward is single anterior median row; two pairs of canines at symphyses of upper and lower jaws, outer pair on upper jaw curved backward; gill membranes attached to isthmus with a narrow free fold across it; strong canines at corner of upper jaw; head naked; dorsal rays IX, 11; gill rakers about 5 + 10; pectoral rays about 11, free edge of preopercle ending as it curves forward at lower corner. Macropharyngodon Bleeker
- *9b*. Lateral line not interrupted posteriorly but bent abruptly downward on caudal region; dorsal rays IX, 11 to 13; scales about 26 or 27.
  - *10a*. Canine teeth at corners of upper jaw; two pairs of canine teeth at symphysis of upper jaw; head naked; gill membranes attached to isthmus with a narrow free fold across it; gill rakers about 6 or 7 + 9 to 12; pectoral rays about 11 to 13.
    - *11a*. Edge of preopercle free posteriorly, but ending at lower corner just as it curves forward; lower pharyngeal with a large median tooth and tiny one at each side of it, and extending forward is the single anterior median row; two pairs of canines at symphyses of upper and lower jaw, outer pair of upper jaw recurved. Leptojulis Bleeker[18]
    - *11b*. Edge of preopercle free as much posteriorly as ventrally; one pair of canines at symphysis of lower jaw, upper jaw with two pairs of canines, outer row recurved. Halichoeres Rüppell
  - *10b*. No canine teeth at corner of upper jaw; edge of preopercle free posteriorly and for some distance ventrally; gill membranes attached to isthmus, without a fold or only a trace of one across it; pectoral rays 12 or 13.
    - *12a*. No canine teeth at symphyses of upper and lower jaws, at symphysis of upper jaw a small space without teeth; sides of jaws with teeth; head naked; gill rakers 8 or 9+17 to 19___________________ Stethojulis Günther
    - *12b*. One pair of canine teeth at symphyses of upper and lower jaws.
      - *13a*. Teeth on sides of jaws; gill rakers 7 or 8 + 18 or 19; head naked except for patch of scales on cheeks. Hemigymnus Günther

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[18] For a discussion of this genus see de Beaufort, Bijdragen Dierkunde Uitgegeven Door Het Koninklijk Zool. Genootschap., pp. 14–17, fig. 1, 1938.

13*b*. Sides of jaws fused into a hard plate; gill rakers about 7 + 12; head naked--- **Anampses** Quoy and Gaimard

4*b*. Scales small, numbering more than 40 rows from upper edge of gill opening to base of caudal fin rays.

14*a*. No deep notch at middle of flower lip, so that two fleshy horns extend forward as part of lower lips at sides of jaw.

15*a*. Lateral line continuous near midaxis of body without abrupt change in its course posteriorly in caudal region; scales about 47; dorsal rays IX, 13; free edge of preopercle extending farther forward ventrally than dorsally; gill membranes free, with a wide fold across isthmus; head with patches of scales on operculum dorsally, and behind eyes; no canines at rictus; gill rakers about 8 + 17; pectoral fin rays about 11; one pair of canines at symphyses of upper and lower jaws. **Cheilio** Lacepède

15*b*. Lateral line following contour of back just below dorsal fin, then changing its course to continue on midaxis of caudal region; scale rows more than 50; head naked; canines absent at corner of upper jaw; gill rakers about 6 or 7+8 to 11; one pair of canines at symphyses of upper and lower jaws.

16*a*. Gill membranes attached to isthmus with a narrow free fold across it; lateral line continuous, with abrupt bend on caudal region; dorsal rays IX, 12; pectoral rays about 12 or 13. **Coris** Lacepède

16*b*. Gill membranes not attached to isthmus, with a wide free fold across it; lateral line interrupted posteriorly continuing again along midaxis of caudal region; dorsal rays IX, 13; pectoral about 11--------------------- **Cymolutes** Günther

14*b*. A deep notch at middle of lower lip, with a fleshy horn extending forward at each side of lower jaw, these forming lips at sides of jaw; a pair of canines at front of each jaw, separated by small teeth at symphyses; scales 52; head scaly; gill membranes attached to isthmus without a free fold; lateral line continuous; pectoral rays 12 or 13; dorsal rays IX, 11; anal III, 10; about 9 gill rakers on lower half of first arch----------- **Labroides** Bleeker

Genus GOMPHOSUS Lacepède

Gomphosus Lacepède, Histoire naturelle des poissons, vol. 3, p. 100, 1802. (Type, *Gomphosus caeruleus* Lacepéde.)

KEY TO THE SPECIES OF GOMPHOSUS FOUND IN THE PHOENIX AND SAMOAN ISLANDS

1*a*. Dorsal and anal fins uniform pale or light greenish, pectoral blackish with a transverse pale band distally and a pale band basally; ground color of body dark green or brownish in alcohol, without brown spots all over body, with a pale area back of head above base of pectoral and sometimes another posteriorly under pectoral fin; no longitudinal black bar through eye; center of each scale with a diffuse vertical bar; black spot on base of upper pectoral fin ray; in adults the dark color of the body continues to tips of upper and lower rays of caudal fin rest of fin white (greenish in life); dorsal rays VIII, 13, anal III, 11; pectoral 15, gill rakers about 24 to 26; scales about 28------------- **Gomphosus tricolor** Quoy and Gaimard

1*b*. Dorsal blackish, margin whitish; anal blackish, margin whitish and a roundish white spot near middle of membrane between each ray, forming a row of white spots along entire length of anal; pectoral fin pale or whitish; ground color of body blackish posteriorly paler anteriorly under side of head and abdomen nearly white; a longitudinal black bar through eye, broken up into one to three spots behind eye, a second bar or series of spots running posteriorly from near dorsal margin of eye, across head; center of each scale with a black spot anteriorly, these spots becoming vertical bars posteriorly; black spot on base of upper ray of pectoral fin; in specimens 55 to 120 mm. in standard length caudal fin margined with a wide transverse white band, rest of fin blackish, but in a specimen 158 mm. black color of caudal fin continuing almost to tips of upper and lower rays; dorsal rays VIII, 13; anal III, 11; pectoral 15; gill rakers about 24 to 26; scales 27 or 28---------------------------- Gomphosus varius Lacepède

GOMPHOSUS TRICOLOR Quoy and Gaimard

Gomphosus tricolor Quoy and Gaimard, Voyage autour du monde . . . *Uranie*, Zool., p. 280, pl. 55, fig. 2, 1824.

115093, Hull Island, channel, July 7–17, 1939, 1 specimen.
52202, Apia, Samoa, Jordan and Kellogg, 2 specimens.

GOMPHOSUS VARIUS Lacepède

Gomphosus varius Lacepède, Histoire naturelle des poissons, vol. 3, pp. 100, 104, pl. 5, fig. 2, 1802.

115092, Rose Island lagoon, June 12–20, 1939, 2 specimens.
115090, Canton Island lagoon coral heads, May 23–24, 1939, 5 specimens.
115091, Tutuila Island, reef at Alofau, June 3, 1939, 2 specimens.
115089, Tutuila Island, reef at Pagai, June 4, 1939, 2 specimens.
52215, Apia, Samoa, Jordan and Kellogg, 3 specimens.

Color in life, from color crayon sketch by author from a specimen taken in Canton Island lagoon: Anterior two-thirds of body olive-green, posterior third purplish brown, very intense on caudal peduncle; upper side of snout orange; a short purple bar in front of eye; an irregular row of purple spots behind eye; lower half of head below eye and below pectoral base pinkish; the opercle with a slight orange tinge; margin of caudal pale; margins of dorsal and anal pale; dorsal with orange along each ray, and a purple spot between first and second spines; anal with yellow-orange spot on membrane between each ray with a purplish narrow submarginal band along the outer edges of these spots; body covered all over with purple brown spots at posterior edge of each scale.

Genus EPIBULUS Cuvier

Epibulus Cuvier, Mém. Mus. Hist. Nat. Paris, vol. 1, p. 111, 1815; Règne animal, ed. 1, p. 264, 1817. (Type, *Sparus insidiator* Pallas.)

EPIBULUS INSIDIATOR (Pallas)

Sparus insidiator Pallas, Spicilegia zoologica . . ., pt. 8, p. 41, pl. 5, fig. 1, 1770.

115608, Canton Island, lagoon coral heads, May 23–25, 1939, 1 specimen.
52440, Apia, Samoa, Jordan and Kellogg, 8 specimens.

Genus LABRICHTHYS Bleeker

Labrichthys Bleeker, Nat. Tijdschr. Ned.-Ind., vol. 6, p. 315, 1854. (Type, *Labrichthys cyanotaenia* Bleeker.)

LABRICHTHYS CYANOTAENIA Bleeker

Labrichthys cyanotaenia Bleeker, Nat. Tijdschr. Ned.-Ind., vol. 6, p. 331, 1854.

52459, Apia, Samoa, Jordan and Kellogg, 3 specimens.
82762, Samoa, Wilkes Exploring Expedition, 1 specimen.
117706, Apia, Samoa, 1 specimen.

Genus CHEILINUS Lacepède

Cheilinus Lacepède, Histoire naturelle des poissons, vol. 3, p. 529, 1802. (Type, *Cheilinus trilobatus* Lacepède.)

KEY TO THE SPECIES REFERRED TO THE GENUS CHEILINUS, REPORTED FROM THE PHOENIX AND SAMOAN ISLANDS

1*a*. Two narrow black bands extending from behind eye nearly to rear of head, another black band above eye, and a pair of black bands on young (joined into a wide diffuse band on large adults) extending from below eye to a point two-thirds the distance back along mouth; posterior margin of caudal fin paler; body greenish; fins with numerous black undulating transverse lines. (See table 20 for counts.)--------- **Cheilinus undulatus Rüppell**

1*b*. Color not as in 1*a*.

  2*a*. About 9 to 12 black lines extending downward and a little backward from cheek and opercle to gill membranes; upper scales with reddish spots, body mostly greenish above------- **Cheilinus diagrammus (Lacepède)**

  2*b*. Color not as in 2*a*.

    3*a*. Body crossed with wide blackish bars and pale interspaces (sometimes diffuse); head with a few black spots posteriorly or with a blackish spot or two in midline of caudal peduncle.

      4*a*. Posterior margin of caudal fin pale; sides of head in adults with numerous short wavy red lines and spots (pale in alcohol); transverse bars as follows: Blackish one across middle of caudal fin; whitish one across base of caudal with a black spot at midaxis; blackish one across caudal peduncle; pale bar at end of soft dorsal and anal, including the fins with blackish spot at midaxis of body; blackish one across middle of body, then pale, then another blackish one across spiny dorsal to pelvics with pale forward, diffuse blackish one through base of pectoral------- **Cheilinus trilobatus Lacepède**

      4*b*. Posterior margin of caudal fin blackish; then a transverse pale bar with a wider blackish bar forward, base of caudal crossed with a white bar; caudal peduncle crossed with a black bar; then five black bars with narrow pale interspaces extending downward from dorsal fin; upper rear part of head with a few black spots or blotches; fine black spots forward and ventrally, most numerous below and under pectoral fin--------- **Cheilinus fasciatus (Bloch)**

    3*b*. No wide transverse blackish bars on body or caudal fin as in 3*a*.

      5*a*. Body with numerous pale spots (reddish or bluish in life); head with pale spots; body often with scattered blackish spots; dorsal spines usually X, sometimes IX (see table 20); gill rakers about 6 or 7+6 or 7---------------------- **Cheilinus chlorourus (Bloch)**

5*b*. Body and head without pale or blackish spots; head with pale (reddish in life) wavy bands radiating from eye; dorsal spines IX; gill rakers about 6+10________________ **Cheilinus unifasciatus Streets**

TABLE 20.—*Counts made on various species of* Cheilinus

Species	Fin rays							
	Dorsal					Anal		Pectoral
	Spines		Soft			Spines	Soft	
	IX	X	9	10	11	III	8	11
trilobatus	3			2	1	3	3	3
unifasciatus	1			1		1	1	1
chlorourus	2	7	5	4		3	3	1
diagrammus	1			1		1	1	2
fasciatus	2			2		1	1	1
undulatus	1			1		1	1	1

Species	Gill rakers																					
	Above angle				Below angle								Total									
	5	6	7	8	5	6	7	8	9	10	11	12	10	11	12	13	14	15	16	17	18	19
trilobatus	3				3								3									
unifasciatus		1								1									1			
chlorourus		1	1			1	1								1		1					
diagrammus		2							1	1									1			1
fasciatus			1	1			1	1									1		1			
undulatus		1										1									1	

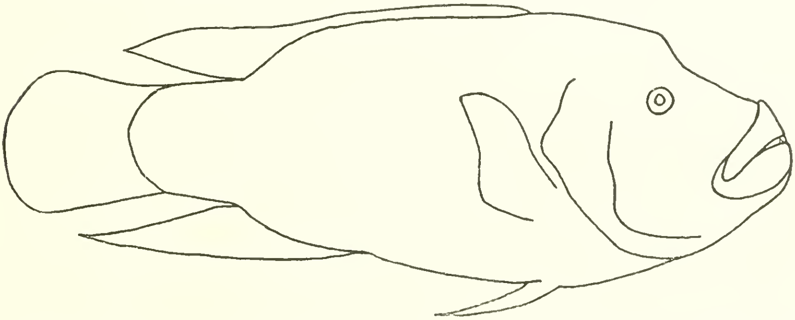

FIGURE 16.—*Cheilinus undulatus* Rüppell: A specimen 820 mm. in standard length caught by the crew of the U. S. S. *Swan* off Canton Island reef. Drawn by author.

CHEILINUS UNDULATUS Rüppell

FIGURE 16

Cheilinus undulatus RÜPPELL, Neue Wirbelthiere zu der Fauna von Abyssinien gehörig, Fische, p. 20, pl. 6, fig. 2, 1835.

115532, Canton Island, off outer edge of reef, April 24, 1939, crew of U. S. S. *Swan*, 1 specimen. Standard length 820 mm., total length 1,050 mm. Color in life bright green. In alcohol head with reticulated narrow pale bands in large curves with pale spots and dashes between them on lower half of head; two black bands behind eye, somewhat interrupted; a wide diffuse black band extending from eye to about two-thirds the way back along mouth; a narrow black band extending upward above eye; posterior margin of caudal fin pale; dorsal, anal, and caudal with numerous narrow black bands alternating with pale one, undulating transversely across the fins, scales anteriorly, and ventrally with vertical undulating black lines; base of pectoral mottled. This large adult has a hump developed on the top of the head, not found in the young of this species.

52487, Pago Pago, Samoa, Jordan and Kellogg, 1 specimen.

CHEILINUS DIAGRAMMUS (Lacepède)

Labrus diagrammus Lacepède, Histoire naturelle des poissons, vol. 3, pp. 448, 518, 1802.

52402, Pago Pago, Samoa, Jordan and Kellogg, 2 specimens.

CHEILINUS TRILOBATUS Lacepède

Cheilinus trilobatus Lacepède, Histoire naturelle des poissons, vol. 3, pp. 527, 537, pl. 31, fig. 3, 1802.

115605, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 1 specimen.

115606, Tutuila Island, reef at Alofau, June 3, 1939, L. P. Schultz, 2 specimens.

100298, Pago Pago, Samoa, Jordan and Kellogg, 2 specimens.

52422, Apia, Samoa, Jordan and Kellogg, 7 specimens.

CHEILINUS FASCIATUS (Bloch)

Sparus fasciatus Bloch, Naturgeschichte ausländischen Fische, vol. 5, p. 18, pl. 257, 1791.

52394, Pago Pago, Samoa, Jordan and Kellogg, 8 specimens.

CHEILINUS CHLOROURUS (Bloch)

Sparus chlorourus Bloch, Naturgeschichte der aüslandischen Fische, vol. 5, p. 24, pl. 260, 1791.

52369, Apia, Samoa, Jordan and Kellogg, 7 specimens.

82758, Samoa, Wilkes Exploring Expedition, 2 specimens.

CHEILINUS UNIFASCIATUS Streets

Cheilinus unifasciatus Streets, U. S. Nat. Mus. Bull. 7, p. 82, 1877 (4 cotypes, U. S. N. M. Nos. 19223, 19224, examined).

Reported from the Samoan Islands.

Genus PSEUDOCHEILINUS Bleeker

Pseudocheilinus Bleeker, Proc. Zool. Soc. London, 1861, p. 409; Versl. Akad. Amsterdam, vol. 13, p. 95, 1862. (Type, *Cheilinus hexataenia* Bleeker.)

PSEUDOCHEILINUS HEXATAENIA (Bleeker)

Cheilinus hexataenia Bleeker, Act. Soc. Sci. Ind. Neerl. (Amboina), vol. 2, p. 84, 1857.

115607, Rose Island, lagoon, June 12 to 20, 1939, 1 specimen.

52417, Apia, Samoa, Jordan and Kellogg, 5 specimens.

Genus NOVACULICHTHYS Bleeker

Novaculichthys Bleeker, Proc. Zool. Soc. London, 1861, p. 414; Versl. Akad. Amsterdam, vol. 13, p. 102, 1862. (Type, *Labrus macrolepidotus* Bloch.)

KEY TO THE SPECIES OF NOVACULICHTHYS FROM PHOENIX AND SAMOAN ISLANDS

1a. Dorsal spines shorter than soft dorsal rays, first two spines not elongate; wide white band across basal half of caudal fin, distal half brownish and reticulated; pale bordered brown bands radiating from eye, one across cheek, one from eye toward base of pectoral fin, and two short ones extending upward and backward from rear of eye; pelvics black with fine white line around margins; under basal region of pectoral fin on body two black bars____________________________ **Novaculichthys taeniourus (Lacepède)**

1b. First two dorsal spines greatly elongate; "brilliant grass-green with pencil-like streaks of black and bands of dark olive, these bands becoming bronze olive on the fins, markings on body of creamy white, those above greenish white" (Jordan and Seale)_____ **Novaculichthys bifer (Lay and Bennett)**

NOVACULICHTHYS TAENIOURUS (Lacepède)

Labrus taeniourus Lacepède, Histoire naturelle des poissons, vol. 3, pp. 448, 518, pl. 29, fig. 1, 1802.

115603, Hull Island, channel, July 7–17, 1939, 1 specimen.

115604, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 1 specimen.

52435, Apia, Samoa, Jordan and Kellogg, 3 specimens.

NOVACULICHTHYS BIFER (Lay and Bennett)

Julis bifer Lay and Bennett, The zoology of Captain Beechey's voyage, Fishes, p. 64, pl. 18, fig. 2, 1839.

Jordan and Seale's specimen of *N. kallosomus* was not located in the National Museum.

Genus THALASSOMA Swainson

Thalassoma Swainson. The natural history and classification of fishes, amphibians and reptiles, or monocardian animals, vol. 2, p. 224, 1839. (Type, *Labrus purpureus* Forskål=*Julis purpureus* Rüppell).

KEY TO THE SPECIES OF THALASSOMA FROM THE PHOENIX AND SAMOAN ISLANDS,[19] REPRESENTED BY SPECIMENS IN THE NATIONAL MUSEUM

1a. Color pattern consisting of a black band extending from tip of snout through eye to base of caudal fin, lower edge of this band running along midaxis of body, and ventral half of body abruptly white (in alcohol), upper edge of black band diffuse, but width of band is about equal to diameter of eye, space above paler; beginning between eyes on top of head and continuing along base of dorsals is a second black bar, becoming paler posteriorly; head without other striking color marks_ **Thalassoma marnae, new species**

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[19] Although Günther, p. 290, 1909, records *Thalassoma lunaris* from Samoa and Fowler and Bean, U. S. Nat. Mus. Bull. 100, vol. 7, p. 327, 1928, refer it to *T. lutescens,* the exact form involved is not clear, so I am omitting it from the key in the absence of specimens.

TABLE 21.—*Counts made on various species of* Thalassoma

Species	Fin rays							Scale rows			Gill rakers on first gill arch										
	Dorsal			Anal			Pectoral				Above						Below				
	Spines	Soft		Spines	Soft																
	VIII	12	13	III	10	11	15	26	27	28	6	7	8	9	10	11	10	11	12	13	14
marnae	9	---	9	8	---	8	10	4	2	1	1	3	---	---	---	---	3	1	---	---	---
umbrostigma	5	1	4	3	---	3	3	1	1	---	---	---	2	1	---	1	---	2	---	1	1
quinquevittata	4	---	4	3	---	3	2	1	2	---	---	---	---	1	2	---	---	---	---	2	1
hardwicke	2	---	2	2	1	1	2	---	2	---	---	---	2	2	---	---	---	---	---	1	1
trilobata	2	---	2	2	---	2	2	---	1	1	---	---	1	---	1	---	---	---	---	2	---
purpureum	2	---	2	2	---	2	2	---	2	---	---	---	---	2	---	---	---	---	---	---	2

1*b*. Color pattern not as in 1*a*.

2*a*. Color pattern consisting of about six or seven blackish vertical bars, with pale interspaces.

3*a*. Front of anal fin without a blackish spot; dorsal fin with a spot between first and second spines; a second large spot near middle of dorsal fins and a small one between last two soft dorsal rays; two streaks back of eye on head and one from front of eye to tip of snout; about six wide vertical dark bars, with narrow pale interspaces about the width of eye (after Streets).

Thalassoma schwanenfeldii (Bleeker)

3*b*. Front of anal fin with a blackish spot, sometimes pale; dorsal fin with a blackish longitudinal band through its middle; five or six wedge-shaped black bars on upper sides of body, these extending on dorsal fin and sometimes intensified in the lengthwise band of dorsal into blotches, especially between first to third spines and first to third soft rays; lower half of body pale; in specimens 3½ to 6½ inches total length, there may be, and usually is posteriorly, a pale longitudinal band along midaxis of body; head with six wide, pale (blue in life) bands radiating from eye, two on snout, one above eye, one posteriorly, and two across cheeks__**Thalassoma hardwicke** (Bennett)

2*b*. Color pattern not made up of vertical color bars.

4*a*. No lengthwise pale bands on side of body or along midaxis in young; top and sides of head with black spots and short black interrupted lines, more or less reticulated; sides of body with blackish vertical lines on scales, these in young more or less prominently W-shaped in patches along midaxis and another row on lower side of body with a third dorsally located; dorsal and anal fins with a lengthwise green band through middle of fin; front of spiny dorsal with a black spot; in young another at beginning of soft dorsal; blackish pigment near tips of pectorals faint or absent.

Thalassoma umbrostigma (Rüppell)

4*b*. A pale lengthwise band near midaxis of body and often with pale lines or narrow bands coming off it at right angles; tips of pectorals usually with blackish pigment.

5*a*. Chin paler than rest of head, whitish in dark-colored specimens, and with a darker diffuse bar between angles of mouth below; in pale specimens of young each scale along base of dorsals has a blackish spot; black spot in dorsal fin between first to third spines, another black spot between second and third soft rays; pale band above eye, one from eye to upper part of snout, another from front of eye curving across corner of mouth to meet its fellow below, one from behind eye curving toward base of pectoral and continuing as a double one below it, and a circular one below eye on cheek-------- **Thalassoma quinkuevittata** (Lay and Bennett)

5*b*. Color pattern not as in 5*a*; two pale bands on side of body; one near midaxis and another below it.

6*a*. Basal portion of anal and dorsal fins with a narrow white band, distally fins green; red or pale lengthwise bands on side of body one-third to one-fourth width of green interspace between them; a wide pale band from behind eye across operculum, branching on opercle one branch near upper base of pectoral other lower edge of opercle and continued on body below pectoral; pale wedge-shaped band in front of eye meeting on snout; all these pale bands bordered with dark lines; front of dorsal with blackish patch------------ **Thalassoma purpureum** (Forskål)

6*b*. Basal half of anal and dorsal fins with a white band, interrupted with green spots at base of each ray, rest of fins green; width of upper red or pale band on side of body more than half width of green interspace between pale bands, lower pale band continuous with pale color below; color of head not as in 6*a*; front of dorsal with blackish spot--- **Thalassoma trilobata** (Lacepède)

THALASSOMA MARNAE, new species

FIGURE 17

Holotype.—A specimen (U.S.N.M. No. 115563) 68 mm. in standard length, taken July 12–15, 1939, by L. P. Schultz on the reef of Hull Island, along with 37 paratypes (U.S.N.M. No. 115570), same locality and data, 29–65 mm.

In addition the following paratypes were collected: U.S.N.M. No. 115566, Hull Island channel, July 7–17, 1939, 26 specimens, 28–61 mm.; U.S.N.M. No. 115565, Enderbury Island reef, May 15–19, 1939, 7 specimens, 42–56 mm.; U.S.N.M. No. 115564, Canton Island reef at ocean, April 25–28, 1939, 3 specimens, 18–34 mm.; U.S.N.M. No. 115568, Canton Island, reef of widest shallow channel, May 13, 1939, 6 specimens, 28–34 mm.; U.S.N.M. No. 115567, Swains Island reef, May 3–9, 1939, 1 specimen, 35 mm.; U.S.N.M. No. 115569, Hull Island channel, July 8–12, 1939, 2 specimens, 25 and 32 mm.

Description.—(Based on the holotype and 82 paratypes as listed above. Detailed counts and measurements of the holotype are given first, followed by those for four paratypes, respectively, from Enderbury, Hull, Canton, and Swains Islands, 53, 55, 34, and 31.2 mm. in standard length. All measurements are expressed in hundredths of the standard length.) Length of head 29.4 (28.7; 31.8; 31.7; 33.0); greatest depth of body 24.3 (26.0; 27.2; 23.5; 25.6); length of snout 7.7 (7.9; 8.0; 8.2; 7.4); diameter of eye 6.9 (7.2; 8.0; 9.4; 9.3); distance from tip of snout to posterior edge of maxillary 5.9 (6.0;

7.4; 6.5; 7.0); distance from tip of snout to origin of dorsal 29.0 (31.5; 32.6; 34.2; 33.3); snout to origin of anal fin 57.4 (53.7; 57.9; 60.8; 57.0); snout to insertion of pelvic fins 30.9 (29.0; 32.0; 31.7; 30.8); tip of snout to center of vent 56.6 (52.3; 56.4; 58.9; 55.0); distance from posterior base of anal fin to mid-base of caudal fin 14.7 (15.9; 16.0; 15.9; 16.0); least depth of caudal peduncle 13.3 (14.3; 13.3; 13.5; 14.1); length of longest ray of pectoral fin 20.0 (21.3; 22.7; 21.4; 21.8); length of longest ray of pelvic fin 11.8 (11.5; 12.9; 13.2; 12.5); length of longest ray of caudal fin 25.7 (25.6; 27.6; 29.4; 27.2); longest dorsal spine 5.0 (6.4; 5.4; 7.3; 7.4); longest soft dorsal ray 10.3 (11.9; 12.0; 14.7; 12.5); longest soft anal ray 9.9 (12.8; 11.8; 11.8; 12.5); least preorbital distance 3.5 (3.6; 4.3; 3.5; 3.8); postorbital length of head 15.7 (15.1; 17.4; 16.8; 17.3); interorbital space (fleshy) 7.4 (8.5; 8.4; 7.6; 8.0).

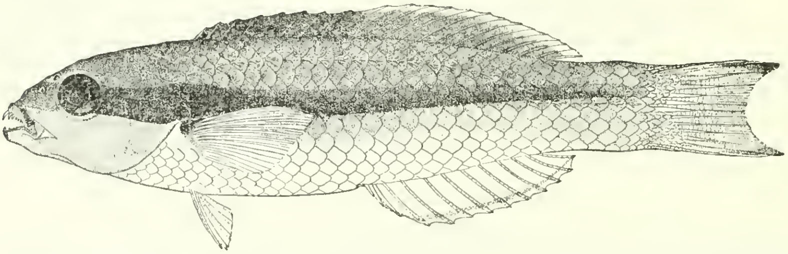

FIGURE 17.—*Thalassoma marnae*, new species: Holotype (U.S.N.M. No. 115563), 63 mm. in standard length.

Dorsal rays VIII, 13 (VIII, 13; VIII, 13; VIII, 13; VIII, 13); anal rays III, 11 (III, 11; III, 11; III, 11; III, 11); pectoral rays 14–14 (14–14; 14–14; 14–14; 14–14); number of scale rows crossing lateral line from upper edge of gill opening to base of caudal fin 26 (26; 27; 26; 26); the downward bend of the lateral line usually occurs at the 20th row; scales from base of first soft dorsal ray to lateral line 2½ (2½; 2½; 2½; 2½); scales from origin of anal fin to lateral line 9 (10; 9; 9; 9); number of scale rows crossing breast 8 (8; 8; 9; 8); number of scales in a zigzag row around the caudal peduncle 18 (18; 18; 18; 20); number of gill rakers on first gill arch——(7+10; 7+11; 7+10; 6+10).

Size small, body somewhat compressed, its thickness about half its depth, premaxillary protractile; pseudobranchiae present; gill membranes attached to the isthmus with a narrow free fold across it; the edge of the preopercle free posteriorly, but this free edge ends just as it turns forward; lower lip with a wide frenum; anus just in front of origin of anal fin; peritoneum blackish; body fully scaled, head naked, lateral line complete with the downward bend occurring on the twentieth scale row (rarely the nineteenth); upper and lower caudal fin rays produced; mouth oblique; teeth in one row on upper and lower jaws with a pair of canines near symphysis of each jaw.

Color in alcohol: White below midaxis on body, darker above; a black band from snout through eye, width of eye, along side of body, and ending at base of rays of caudal fin, the lower edge of this band being along the midaxis of body; upper edge of black line diffuse, grading into pale dusky to light brownish above; from between eyes a second black band extends along middorsal line and each side along base of dorsal fin, fading out posteriorly under soft dorsal; spinous dorsal blackish, the color continuing as a black band along basal three-fourths of soft dorsal, the marginal fourth of the fin white; pectorals and pelvics pale, a black spot, triangular in shape, at upper base of pectoral, anal fin white, caudal fin pale; dorsal and ventral edges white, with dark pigment on the next two or three submarginal rays, middle rays of caudal white; inner side of operculum blackish.

Color in life (from a color crayon sketch by author): Upper sides between black bands olive; lower side of head silvery, lower sides and belly yellowish to orange; a silvery band just below the lateral black band extends from head to tip of caudal fin, grading into the yellow-orange ventrally; anal fin rose-colored; upper and lower rays of caudal fin rose-colored.

Remarks.—This new species differs from all other labrids in its coloration but is most nearly like *Thalassoma amblycephalis*, which is similarly colored in regard to the black band on the side and the one on and along the base of the dorsal fins; the white marginal band on the soft dorsal of *T. amblycephalis* is narrower than on *T. marnae*, and the dorsal half of the body is more uniform blackish. In *T. marnae* there is no trace of a pale streak from below eye across cheek, nor one from lower edge of eye across opercle to upper edge of pectoral base, and the tips of the pectorals are not heavily pigmented.

Named for my young daughter, Marna, now 10 years old.

THALASSOMA SCHWANENFELDII (Bleeker)

Julis (Julis) schwanenfeldii BLEEKER, Nat. Tijdschr. Ned. Ind., vol. 4, p. 288, 1853.

Streets[20] records *Julius schwanenfeldii* Bleeker (U.S.N.M. No. 15133) and describes the specimen as given in my key. This description fits plate 33, figure 7, in Bleeker's Atlas. Fowler[21] identified this same specimen that Steinberger collected as *Halichoeres kawarin* but still retains Streets' identification under *T. schwanenfeldii* on p. 351. The specimen in the meantime dried up, and since all that is left are bones and scales I am retaining it under *T. schwanenfeldii* on the basis of Streets' description.

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[20] U. S. Nat. Mus. Bull. 7, p. 99, 1877.

[21] Fishes of Oceania, p. 343, 1928.

15133, Samoan Islands, Col. A. B. Steinberger, 1 dried specimen, partially destroyed.

THALASSOMA HARDWICKE (Bennett)

Sparus hardwicke J. W. Bennett, A selection of rare and curious fishes found upon the coast of Ceylon, pl. 12, 1828–30.

115601, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 5 specimens.

115599, Tutuila Island, reef at Alofau, June 3, 1939, 36 specimens.

115602, Tutuila Island, reef at Pagai, June 4, 1939, 13 specimens.

115600, Hull Island, channel, July 7–17, 1939, 1 specimen.

52403, Apia, Samoa, Jordan and Kellogg, 7 specimens.

41557, Samoan Islands, C. H. White, 1 specimen.

THALASSOMA UMBROSTIGMA (Rüppell)

Julis umbrostigma Rüppell, Neue Wirbelthiere zu der Fauna von Abyssinien gehörig, Fische, p. 11, pl. 3, fig. 2, 1835.

115592, Canton Island, reef at ocean, April 25–28, 1939, 29 specimens.

115591, Canton Island, reef of widest shallow channel, May 13, 1939, 3 specimens.

115583, Canton Island, lagoon, May 23–25, 1939, 5 specimens.

115593, Enderbury Island, reef, May 15–19, 1939, 89 specimens.

115590, Tau Island, reef at Siulagi Point, June 27, 1939, 13 specimens.

115587, Swains Island, reef, May 3–9, 1939, 9 specimens.

115594, Rose Island, reef, June 11–14, 1939, 9 specimens.

115589, Hull Island, reef, July 12–15, 1939, 28 specimens.

115586, Hull Island, channel, July 8–12, 1939, 9 specimens.

116175, Tutuila Island, Fagasa Bay, rock pools, June 5, 1939, 7 specimens.

115585, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 1 specimen.

115582, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 1 specimen.

115588, Tutuila Island, reef at Alofau, June 3, 1939, 1 specimen.

52265, Apia, Samoa, Jordan and Kellogg, 3 specimens.

THALASSOMA QUINQUEVITTATA (Lay and Bennett)

Scarus quinquevittatus Lay and Bennett, The zoology of Captain Beechey's voyage, p. 66, pl. 19, fig. 3, 1839.

115573, Canton Island, lagoon, April 23 to May 12, 1939, 1 specimen.

115581, Canton Island, reef at ocean, April 25–28, 1939, 17 specimens.

115574, Canton Island, reef of widest shallow channel, May 13, 1939, 10 specimens.

115571, Swains Island, reef, May 3–9, 1939, 53 specimens.

115575, Enderbury Island, reef, May 15–19, 1939, 95 specimens.

115572, Rose Island, reef, June 11–14, 1939, 184 specimens.

115577, Tau Island, reef at Siulagi Point, June 27, 1939, 5 specimens.

115576, Hull Island, channel, July 8–12, 1938, 162 specimens.

115578, Hull Island, channel, July 7–17, 1939, 28 specimens.

115580, Hull Island, reef, July 12–15, 1939, 41 specimens.
115579, Tutuila Island, reef at Alofau, June 3, 1939, 1 specimen.
52210, Apia, Samoa, Jordan and Kellogg, 1 specimen.

THALASSOMA PURPUREUM (Forskål)

Scarus purpureus FORSKÅL, Descriptiones animalium . . ., pp. x, 27, 1775.

115561, Canton Island, reef at ocean, April 25–28, 1939, 2 specimens.
115562, Canton Island, lagoon, May 23–25, 1939, 1 specimen.
115559, Enderbury Island, reef, May 15–19, 1939, 1 specimen.
115560, Rose Island, reef, June 11–14, 1939, 1 specimen.
115558, Hull Island, reef, July 12–15, 1939, 1 specimen.

THALASSOMA TRILOBATA (Lacepède)

Labrus trilobatus LACEPÈDE, Histoire naturelle des poissons, vol. 3, pp. 454, 526, pl. 4, fig. 3, 1802.

115598, Canton Island, reef at ocean April 25–28, 1939, 4 specimens.
115595, Enderbury Island, reef, May 15–19, 1939, 2 specimens.
115596, Tau Island reef at Siulagi Point, June 27, 1939, 1 specimen.
115597, Canton Island, lagoon, coral heads, May 23–25, 1939, 1 specimen.
52373, Apia, Samoa, Jordan and Kellogg, 1 specimen.

Color in life (from author's color crayon sketch of a specimen collected at Canton Island): Head pale orange, with blue upper lips and pale blue chin; two blue spots over eye and one below it; tip of opercle blue; blue at base of pectoral and blue behind it in axil; pelvic fin blue and green; along basal portion of dorsal and anal fins a narrow orange band, above this through middle of fin a green band, thence a series of orange spots between each ray on membranes, the edges of these fins green; upper and lower caudal rays and distal portion of caudal fin blue; along mid-axis of body an orange band, another on lower sides at about level of ventral edge of pectoral base; middle of upper sides with a row of oblong rectangular orange blotches, these orange bands on sides connected with each other by straight orange lines, the oblong rectangular interspaces bright green.

Genus MACROPHARYNGODON Bleeker

Macropharyngodon BLEEKER, Proc. Zool. Soc. London, 1861, p. 412; Versl. Akad. Amsterdam, vol. 13, p. 100, 1862. (Type, *Julis geoffroyi* Bleeker.)

MACROPHARYNGODON GEOFFROYI (Bleeker)

Julis geoffroyi QUOY and GAIMARD, Voyage autour du monde . . ., *Uranie*, Zool., p. 270, pl. 56, fig. 3, 1824.

Although de Beaufort [21a] combines *Leptojulis* and *Macropharyngodon*, I have separated them here on the basis of the lateral line, interrupted in the latter, complete in *Leptojulis pardalis*, but this may not be of generic significance.

52304, Apia, Samoa, Jordan and Kellogg, 1 specimen.

[21a] Bijdragen Dierkund Uitgegeven Door Het Koninklijk Zool. Genootschap, pp. 15–17, fig. 1, 1938.

Genus LEPTOJULIS Bleeker

Leptojulis Bleeker, Proc. Zool. Soc. London, 1861, p. 412; Versl. Akad. Amsterdam, vol. 13, p. 100, 1862. (Type, *Leptojulis cyanopleura* Bleeker.)

LEPTOJULIS PARDALIS Kner

Leptojulis pardalis Kner, Sitzb. Akad. Wiss. Wien, vol. 56, p. 728, pl. 3, fig. 2 (9 in text), 1867.

115609, Tutuila Island, reef at Pagai, June 4, 1939, 2 specimens.

52230, Apia, Samoa, Jordan and Kellogg, 3 specimens.

Genus HALICHOERES[22] Rüppell

Halichoeres Rüppell, Neue Wirbelthiere zu der Fauna von Abyssinien gehörig, Fische, p. 14, 1935. (Type, *H. bimaculatus* Rüppell.)

KEY TO THE SPECIES OF HALICHOERES FROM THE PHOENIX AND SAMOAN ISLANDS, REPRESENTED BY SPECIMENS IN THE NATIONAL MUSEUM

1*a*. Dorsal rays IX, 13; anal III, 12, color dark brownish or blackish, not pale (white) with black markings but dark with paler markings; pelvics blackish (see table 22 for counts made on this genus).

  2*a*. Margins of dorsal and anal with pale band; caudal fin blackish with a wide pale margin posteriorly and dorsally and ventrally at rear of fin; pectoral blackish; about three pale streaks under pectoral fin; head and anterior part of body with pale streaks, somewhat indistinct; no white-bordered black spot in soft dorsal.
  Halichoeres marginatus Rüppell

  2*b*. Margins of dorsal and anal fins blackish; caudal fin plain grayish to blackish in adults, nearly white in young, posterior margin not whiter than rest of fin; pectoral paler than body; a large white-bordered black spot near front of soft dorsal; sides of body and head with narrow pale streaks or lines, very obscure in adults, most pronounced in young.
  Halichoeres notopsis (Cuvier and Valenciennes)

1*b*. Dorsal rays IX, 11 or 12; anal rays III, 11 or 12 (usually 11 except in *H. hoevenii*), pectorals pale, at least distal three-fourths of rays; general background pale with blacker marking (probably mostly red or green in life).

    3*a*. A blackish spot or blotch dorsally and posteriorly on caudal peduncle, or dorsally on base of caudal fin rays (in life this spot bluish or blackish).

      4*a*. A black spot between first and second dorsal spines; a white-bordered or ocellated black spot between first to fourth soft dorsal rays; an ocellated black spot at base of caudal fin rays above midaxis; dorsal fin somewhat barred or reticulated; anal fin with three or four light brownish lengthwise streaks; a black-pigmented area in front and just behind eye; paired fins pale; in life body marked with alternating red and blue lengthwise streaks.
      Halichoeres hoevenii (Bleeker)

      4*b*. No black spots in middle of length of dorsal fin and but rarely with a faint grayish spot at front of spinous dorsal; a black blotch dorsally on caudal peduncle considerably in advance of base of

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[22] *Halichoeres chloropterus* (Bloch) was reported from Samoa by Schmeltz, but since we do not have any specimens of it from the locality under consideration and it has not been found there since I have omitted it from the key.

caudal fin rays; in young 1¾ inches and smaller a tiny black spot near midbase of caudal fin rays, but no black spots in dorsal fin; these young specimens with three rows of black specks (one speck on each scale) on sides of belly; adults with chin and cheeks pale this area bordered below eye with a blue streak that curves downward along posterior margin of operculum and forward on gill membranes; under pectoral a blue or blackish streak runs obliquely to belly under pelvics; eye pale; posteriorly on each scale dark pigment (blue in life), intensified near middle of sides of body; anal with a pale streak near its base; dorsal with two or three narrow pale streaks; blue color markings absent or obscure in young less than 3 inches in total length; dorsally base of pectoral fin black.
Halichoeres trimaculatus (Quoy and Gaimard)

3*b*. No blackish spot at base of caudal fin or on sides of caudal peduncle; caudal peduncle plain, with bars or with blotches but not as in 3*a*.

5*a*. A white spot on body at base of spiny dorsal between third to fifth spines, then abruptly blackish, with a second pale area on body at base of fourth to sixth soft rays; all fins pale (white in alcohol) except basal half of dorsals between white spots which is blackish, near middle of each scale above and below its center a pair of black spots connected with paler pigment; under side of body plain pale; head with white streak from eye to tip of snout; three streaks radiating from eye posteriorly; one across cheek considerably below eye from below mouth to opercle; shoulder under edge of operculum with white streak. Color in life from notes taken on a specimen from Rose Island lagoon; body light gray with two bright dark blue spots on each scale in upper sides; bright yellow area at middle of base of spiny dorsal followed by a black blotch; soft dorsal yellowish with mottlings of brick red; bright lemon-yellow spot on body at middle of soft dorsal; wavy orange lines on head; orange spots near occiput; tail orange, spots yellow.
Halichoeres centriquadrus (Lacepède)

5*b*. Color not as in 5*a*.

6*a*. Body with three wide brownish bars, one across head, one through middle of dorsals, the last across caudal peduncle; bar on head broken with a wide pale band from mouth past lower part of eye to above upper edge of pectoral base; interorbital space pale, then two black spots forward on top of head, and a median one just behind tip of snout; pectoral, caudal, and pelvic fins mostly pale; front of dorsal with a black spot; in brownish part of dorsal fin (where middle bar of body extends on it) an ocellated brownish blotch near middle of fin.
Halichoeres notophthalmus (Bleeker)

6*b*. Color not as in 6*a*.

7*a*. A large black spot between the first and third soft dorsal rays; dorsal edge of pectoral base pale; sides of body with areas of black W-shaped markings sometimes occupying entire upper sides of body; opercle with a black blotch on posterior upper angle; a pale band from front of eye to snout bordered above and below with black (blue in life) bands; wide pale band across cheek below eye, then a (blue) blackish narrower band, lower part of head pale; upper side of snout with a V-shaped blackish mark; above eyes two more irregular black marks or spots, from behind eye two black bands radiate one downward and the other zigzags posteriorly and dorsally; caudal, pelvics, and pectorals pale; on young 1 to 2 inches long, a prominent black spot at front of dorsal, a black area behind eye, one at rear of head, very large one middle of body, and one on caudal peduncle.

Halichoeres margaritaceus (Valenciennes)

7b. No black spot in dorsal fin; dorsal edge of pectoral base with a black spot; anterior part of body with about ten lengthwise blue streaks, seven or eight on head; dorsal and anal with two or three lengthwise streaks; pectoral and pelvics pale, tips of rays with a little pigment; base of caudal fin brownish, then a pale area followed distally with brown pigment, the posterior margin pale_____________ **Halichoeres kallochroma (Bleeker)**

TABLE 22.—*Counts made on various species of* Halichoeres

Species	Number of fin rays									Number of rows of scales			Number of gill rakers on first gill arch							
	Dorsal				Anal			Pectoral												
	Spines	Soft rays			Spines	Soft rays							Above angle				Below angle			
	IX	11	12	13	III	11	12	12	13	26	27	28	6	7	8	9	9	10	11	12
margaritaceus	2	2	---	---	2	2	---	2	---	---	2	---	1	1	---	---	1	1	---	---
centriquadrus	2	2	---	---	2	2	---	---	2	2	---	---	---	---	---	2	---	---	---	2
notopsis	3	---	---	3	3	---	3	---	3	---	---	2	---	2	---	---	---	1	---	1
trimaculatus	4	4	---	---	3	3	---	---	3	3	---	---	2	---	---	---	---	---	---	2
hoevenii	1	---	1	---	1	---	1	---	2	---	1	---	1	---	---	---	---	1	---	---
marginatus	1	---	---	1	1	---	1	---	1	---	---	1	---	1	---	---	---	---	---	1
kallochroma	1	---	1	---	1	1	---	---	2	---	---	1	---	1	---	---	---	---	1	---
notophthalmus	1	1	---	---	1	1	---	---	1	---	1	---	---	---	---	1	---	---	---	1

HALICHOERES MARGINATUS Rüppell

Halichoeres marginatus Rüppell, Neue Wirbelthiere zu der Fauna von Abyssinien gehörig, Fische p. 16, 1835.

52209, Apia, Samoa, Jordan and Kellogg, 1 specimen.

HALICHORES NOTOPSIS (Cuvier and Valenciennes)

Julis notopsis (Kuhl and van Hasselt) Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 13, p. 485, 1839.

115545, Tutuila Island, reef at Alofau, June 3, 1939, 12 specimens.
115546, Tau Island, reef at Siulagi Point, June 27, 1939, 5 specimens.
116,174, Tutuila Island, Fagasa Bay, rock pools, June 5, 1939, 1 specimen.
52221, Apia, Samoa, Jordan and Kellogg, 8 specimens.

HALICHOERES HOEVENII (Bleeker)

Julis (*Halichoeres*) *hoevenii* Bleeker, Nat. Tijdschr. Ned. Ind., vol. 2, p. 240, 1851.

52270, Apia, Samoa, Jordan and Kellogg, 1 specimen.

HALICHOERES TRIMACULATUS (Quoy and Gaimard)

Julis trimaculata Quoy and Gaimard, Voyage autour du monde . . . *Astrolabe*, Zool., vol. 3, p. 705, pl. 20, fig. 2, 1834.

115551, Canton Island, reef of the widest shallow channel, May 13, 1939, 79 specimens.

115549, Canton Island, lagoon, coral heads, May 23–26, 1939, 65 specimens.

115557, Canton Island, lagoon, April 23 to May 12, 1939, 5 specimens.

115552, Tau Island, reef at Siulagi Pt., June 27, 1939, 1 specimen.

115550, Tutuila Island, reef at Alofau, June 3, 1939, 190 specimens.

115556, Tutuila Island, reef at Pagai, L. P. Schultz and Frank Taiga, 63 specimens.

115555, Swains Island, reef, May 3–9, 1939, 12 specimens.

115554, Rose Island, reef, June 11–14, 1939, 3 specimens.

115553, Rose Island, lagoon, June 12–20, 1939, 6 specimens.

52226, Apia, Samoa, Jordan and Kellogg, 9 specimens.

56984, Apia, Samoa, 7 specimens.

HALICHOERES CENTRIQUADRUS (Lacepède)

Labrus centriquadrus (Commerson) Lacepède, Histoire naturelle des poissons, vol. 3, pp. 437, 493, 1802.

115544, Hull Island, channel, July 7-17, 1939, 1 specimen.

115548, Rose Island, reef, June 11–14, 1939, 1 specimen.

115547, Rose Island, lagoon, June 12–20, 1939, 1 specimen.

52229, Apia, Samoa, Jordan and Kellogg, 4 specimens.

HALICHOERES NOTOPHTHALMUS (Bleeker)

Tautoga notophthalmus Bleeker, Sci. Ind. Neerl. Act. Soc. (Manado), vol. 1, p. 53, 1856.

52256, Apia, Samoa, Jordan and Kellogg, 2 specimens.

HALICHOERES MARGARITACEUS (Valenciennes)

Julis margaritaceus Valenciennes, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 13, p. 484, 1839.

115540, Swains Island, reef, May 3–9, 1939, 15 specimens.

115543, Canton Island, reef at ocean, April 25–28, 1939, 11 specimens.

115542, Enderbury Island, reef, May 15–19, 1939, 14 specimens.

115541, Tau Island, reef at Siulagi Point, June 27, 1939, L. P. Schultz and Frank Taiga, 54 specimens.

51845 (6 cotypes of *Halichoeres daedalma* Jordan and Seale).

45089, Samoa, Rev. S. G. Whitmee, 1 specimen.

52194, Apia, Samoa, Jordan and Kellogg, 15 specimens.

HALICHOERES KALLOCHROMA (Bleeker)

Julis (*Halichoeres*) *kallochroma* Bleeker, Nat. Tijdschr. Ned. Ind., vol. 4, p. 289, 1853.

51744 (type of *Platyglossus flos-corallis* Jordan and Seale), Apia, Samoa, Jordan and Kellogg.

TABLE 23.—*Counts made on various species of* Stethojulis

Species	Number of fin rays							Number of rows of scales			Number of gill rakers on first gill arch						
	Dorsal		Anal		Pectoral						Above angle			Below angle			
	Spines	Soft rays	Spines	Soft rays	12	13	14	25	26	27	9	10	11	16	17	18	19
	IX	11	III	11													
trilineata	1	1	1	1	---	2	---	---	1	---	---	1	---	---	1	---	---
phekadepleura	2	2	2	2	2	---	---	1	1	---	1	2	---	---	1	1	1
casturi	2	2	2	2	---	2	---	---	2	---	---	2	---	---	1	1	---
axillaris	2	2	2	2	---	2	---	---	2	---	---	2	---	---	1	---	1
strigiventer	1	1	1	1	---	---	2	---	1	---	---	1	---	---	1	---	---

Genus STETHOJULIS Günther

Stethojulis GÜNTHER, Ann. Mag. Nat. Hist., vol. 8, p. 386, 1861. (Type, *Julis strigiventer* Bennett.)

KEY TO THE SPECIES STETHOJULIS FROM THE PHOENIX AND SAMOAN ISLANDS BASED ON SPECIMENS IN THE NATIONAL MUSEUM WITH THE EXCEPTION OF S. RENARDI (for counts see table 23)

1*a*. Lower sides of body (below midaxis) with three or four rows of blackish or brownish spots, these spots near center of each scale; in young these spots less prominent and a blackish spot at midbase of caudal fin; a narrow pale streak across head from middle of side of upper lip past lower edge of eye to level of upper edge of pectoral base; general ground color above midaxis of body brownish, either plain in color or with numerous tiny white spots arranged in 14 or 15 lengthwise rows on body, head finely white spotted above pale streak or plain brownish; lips pale; dorsal fin finely barred; other fins plain pale______________ **Stethojulis phekadopleura** (Bleeker)

1*b*. Lower half of body without dark spots arranged in three or four rows.

2*a*. Midaxis of cadual peduncle with two or three pale-bordered black spots, these in front of base of caudal fin rays; just above upper edge of pectoral base a white or pale-colored bar often continuing to base of caudal fin; a narrow white line or streak from snout past lower edge of eye across opercle; general color of body brown above, paler below, plain brownish in some specimens, others with rows of tiny white spots, sometimes more prominent ventrally but usually most prominent in dorsal half of body; pale streak extending past upper edge of orbit, thence posteriorly along middorsal side, sometimes obscure; young with black spots at bases of last ray of dorsal and anal fins, fainter in anal fin. Color in life, from color crayon sketch by author of a specimen from Canton Island: Dorsal fin brown; upper half of body and head dark chocolate-brown; middle of side below midaxis brownish red, paler below; belly pale; anal fin pale blue; a white narrow band along midaxis of body continued forward just below eye to tip of snout as a bright yellow band; below this yellow band on cheek reddish brown fading into whitish ventrally; a triangular bright red spot just above the upper edge of pectoral base, base of pectoral fin with red spot; on midaxis of caudal peduncle two or three black spots bordered with bright green with a bluish tinge; caudal fin yellowish orange____________________ **Stethojulis axillaris** (Quoy and Gaimard)

2*b*. Midaxis of caudal peduncle without pale-bordered black spots or black spots.

3*a*. A prominent pale streak extending past lower edge of pectoral base.

4*a*. A prominent pale streak extending below corner of mouth across lower cheeks under lower edge of pectoral base along lower side to base of caudal fin rays; a short streak from snout past lower edge of eye, pale in front of eye, across opercle, blackish on opercle, thence extending as a short pale bar only over pectoral base; a narrow pale streak from middle of snout, past upper part of orbit, thence from upper edge of gill opening just below lateral line pores, anteriorly, to caudal fin base; belly pale below lower pale streak, blackish above; all fins pale___________ **Stethojulis trilineata** (Bloch in Schneider)

4*b*. A prominent pale streak extending from shoulder past lower edge of pectoral base but ending about over origin of anal fin, and not continuing to caudal fin or occurring on head; pale streak from tip of snout past lower edge of eye and ending just past upper edge of pectoral base; pale streak from upper snout past upper edge of eye above pectoral fin base; to midbase of caudal fin rays, sometimes with a black spot just as it ends, another pale streak a little below base of dorsal fin; belly pale (after Bleeker).

Stethojulis renardi (Bleeker)

3*b*. No single prominent pale streak extending lengthwise past lower edge of pectoral base.

5*a*. A curved pale streak from under and below corner of mouth across cheek to lower edge of opercle; another from rear of maxillary past lower edge of eye to above pectoral base, where it is much wider, giving off a branch that runs to base of caudal fin rays and a narrower short one on next dorsal row of scales, the streak ending under pectoral fin; from upper part of snout in front of eyes a third pale streak extending past orbit, two or three scales past upper edge of gill opening; pale streak from eye to along base of dorsals; shoulder girdle with pale streak along outline of opercle; body pale below, darker above. Color in life taken from color crayon sketch by author: A reddish-purple line running from upper middle of snout, touching upper edge of eye, thence to base of first few rays of spiny dorsal; a narrow line of same color extending from behind eye backward at same level ending below first few rays of spiny dorsal; upper side of head grass green; eye orange; tip of snout and tip of chin yellow; from side of upper lip a reddish-purple line or narrow band extending past lower edge of eye curving over upper edge of gill opening, thence posteriorly behind pectoral fin turning dark purple or bluish, ending near midaxis of body below base of first soft ray of dorsal; space below this line under eye orange, lower part of head, and operculum grayish olive; a brilliant scarlet band curving from just behind opercle over upper base of pectoral and ending behind that fin; below this a narrow bright blue band anteriorly; from upper rear edge of pectoral base a purplish-red band curving downward behind pectoral fin thence posteriorly, slanting upward where it becomes blue on caudal region; a purple curved band, from under side of chin upward on cheek thence downward to subopercle; under side of body grayish olive; caudal fin plain gray as are dorsal and anal fins; upper sides and sides greenish to olive; along base of dorsal fin a bluish band.

Stethojulis casturi (Bleeker)

5*b*. A pale streak from snout past lower edge of eye ending at rear edge of operculum at level of pectoral base; about four or five pale lengthwise streaks on lower side of body from behind head, becoming indistinct on caudal peduncle; a black spot considerably above midbase of caudal fin rays; a large black spot on last three rays of soft dorsal; a fainter and smaller black spot on last two rays of anal fin; top of head with fine blackish specks; a blackish spot at tip of snout; no white above pectoral base or on shoulder (description based on a specimen 38 mm. in standard length).
Stethojulis strigiventer (Bennett)

STETHOJULIS PHEKADOPLEURA (Bleeker)

Julis (*Halichoeres*) *phekadopleura* BLEEKER, Verh. Batav. Genootsch. (Bali), vol. 22, p. 8, 1849.

115619, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 4 specimens.

115617, Tau Island, reef at Siulagi Point, June 27, 1939, 1 specimen.

116176, Tutuila Island, Fagasa Bay, rock pools, June 5, 1939, 1 specimen.

115618, Tutuila Island, reef at Alofau, June 3, 1939, 11 specimens.

52393, Apia, Samoa, Jordan and Kellogg, 10 specimens.

STETHOJULIS AXILLARIS (Quoy and Gaimard)

Julis axillaris QUOY and GAIMARD, Voyage autour du monde . . . *Uranie*, Zool., p. 72, 1824.

115613, Swains Island, reef, May 3–9, 1939, 1 specimen.

115611, Canton Island, reef of widest shallow channel, May 13, 1939, 2 specimens.

115616, Canton Island, reef at ocean, April 25–28, 1939, 4 specimens.

115610, Enderbury Island, reef, May 15–19, 1939, 5 specimens.

115615, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 6 specimens.

115612, Tutuila Island, reef at Alofau, June 3, 1939, 9 specimens.

52211, Apia, Samoa, Jordan and Kellogg, 6 specimens.

66092, Apia, Samoa, Jordan and Kellogg, 3 specimens.

STETHOJULIS TRILINEATA (Bloch)

Labrus trilineatus BLOCH, *in* Schneider, Systema ichthyologiae . . ., p. 253, 1801.

115624, Tutuila Island, reef at Alofau, June 3, 1939, 1 specimen.

STETHOJULIS RENARDI (Bleeker)

Julis (*Halichoeres*) *renardi* BLEEKER, Nat. Tijdschr. Ned. Ind., vol. 2, p. 253, 1851.

No specimen in the National Museum from the Phoenix and Samoan Islands.

STETHOJULIS CASTURI (Bleeker)

Julis (*Halichoeres*) *casturi* BLEEKER, Nat. Tijdschr. Ned. Ind., vol. 3, p. 768, 1852.

115621, Enderbury Island, reef, May 15–19, 1939, 2 specimens.

115622, Tutuila Island, reef at Alofau, June 3, 1939, 4 specimens.

115620, Canton Island, reef at Ocean, April 25–28, 1939, 2 specimens.

52416, Apia, Samoa, Jordan and Kellogg, 3 specimens.

STETHOJULIS STRIGIVENTER (Bennett)

Julis strigiventer BENNETT, Proc. Zool. Soc. London, 1832, p. 184.

115623, Tutuila Island, reef at Alofau, June 3, 1939, 1 specimen, 38 mm. standard length.

Genus HEMIGYMNUS Günther

Hemigymnus GÜNTHER, Ann. Mag. Nat. Hist., vol. 8, p. 386, 1861. (Type *Mullus fasciatus* Thunberg, 1776.)

KEY TO THE SPECIES OF HEMIGYMNUS FROM THE PHOENIX AND SAMOAN ISLANDS BASED ON SPECIMENS IN THE NATIONAL MUSEUM

1*a*. Anterior portion of body pale, mostly white in alcohol, blackish color begins abruptly at a line beginning at origin of dorsal, thence downward to middle distance between base of pelvics and anal origin; very margin of caudal fin with white; caudal, dorsal, and anal fins blackish or brownish; dorsal and anal with narrow pale band along their margins; pectoral and pelvic fins pale; blackish patch behind eye; in my specimens the pale bar across the caudal region is faint and lacking in a few; dorsal rays IX, 11; anal III, 11; pectoral 13; gill rakers on first gill arch 8+19; scale rows 27.
Hemigymnus melapterus (Bloch)

1*b*. Body with a white bar at front of dorsal, another from dorsal to origin of anal; third from middle of soft dorsal to middle of anal, last across caudal peduncle just past rear of bases of dorsal and anal; head paler than body with a pale streak forward from eye, another below eye, these separated by a darker streak; dorsal rays IX, 11; anal III, 11; pectoral 13; scale rows 27; gill rakers 7+18_____________ Hemigymnus fasciatus (Bloch)

HEMIGYMNUS MELAPTERUS (Bloch)

Labrus melapterus BLOCH, Naturgeschichte der ausländischen Fische, pt. 5, p. 137, pl. 285, 1791.

115626, Tutuila Island, reef at Alofau, June 3, 1939, 1 specimen.

115625, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 4 specimens.

52486, Apia, Samoa, Jordan and Kellogg, 7 specimens.

HEMIGYMNUS FASCIATUS (Bloch)

Labrus fasciatus BLOCH, Naturgeschichte der ausländischen Fische, pt. 6, p. 6, pl. 290, 1792.

52443, Apia, Samoa, Jordan and Kellogg, 1 specimen.

Genus ANAMPSES Quoy and Gaimard

Anampses QUOY and GAIMARD (after Cuvier's MS.), Voyage autour du monde . . . *Uraine*, p. 276, 1824. (Type *Anampses cuvier* Quoy and Gaimard.)

Since we have specimens of but one of the three species of *Anampses* (*A. caeruleo-punctatus*, *A. melanurus*, and *A. diadematus*) reported from the Samoan Islands, no key has been attempted by me.

ANAMPSES CAERULEO-PUNCTATUS Rüppell

Anampses caeruleo-punctatus RÜPPELL, Atlas zu der Reise im nördlichen Afrika, Fische, p. 42, pl. 10, fig. 1, 1828.

83015, Hull Island, Wilkes Exploring Expedition, 1 specimen.

52428, Apia, Samoa, Jordan and Kellogg, 4 specimens.

Genus CHEILIO Lacepède

Cheilio Lacepède, Histoire naturelle des poissons, vol. 4, p. 432, 1803. [Type, *Cheilo auratus* Lacepède (=*Labrus inermis* Forskål).]

CHEILIO INERMIS (Forskål)

Labrus inermis Forskål, Descriptiones animalium . . ., p. 34, 1775.

52478, Apia, Samoa, Jordan and Kellogg, 2 specimens.

Genus CORIS Lacepède

Coris Lacepède, Histoire naturelle des poissons, vol. 3, p. 96, 1802. (Type, *Coris aygula* Lacepède.)

KEY TO THE SPECIES OF CORIS FROM THE PHOENIX AND SAMOAN ISLANDS (see table 24)

1*a*. Head with scattered, pale-bordered, brown or black spots (a few also on body next to head), these becoming faint or absent in specimens a foot long; a white band around body from below rear of spinous dorsal to region of anal origin, more or less faint in adults a foot long; body brownish or blackish, head paler; margins of dorsal and anal white in specimens 6 inches long; rear margin of caudal fin white in specimens 7 inches in total length and shorter but almost blackish in larger ones; pelvics dusky; pectoral pale, at least distally, other fins blackish. Color of a specimen 34.5 mm. in standard length: Background color pale (probably green in life); a large black spot occupying membranes between five rays at end of spines and beginning of soft dorsal rays, a second black spot at rear base of soft dorsal surrounded by a brown ring on body and dorsal fin; base of caudal fin crossed with a curved black band; margin of anal pale, rest of anal fin blackish; margin of dorsal fin pale, rest of dorsal fin somewhat barred. (I refer the small specimen from Canton Island reef to this species mostly on the basis of the spots on the head)___ **Coris angulata Lacepède**

1*b*. Head unspotted and no white band around middle of body.

2*a*. A black-bordered white spot on top of tip of snout; black-bordered with white saddles under spinous dorsal, under middle of soft dorsal, and a little behind rear base of soft dorsal on caudal peduncle; a black narrow band across basal region of caudal fin; margin or dorsal and anal fins with fine white margin then a submarginal black line, rest of fin pale. **Coris greenovi (Bennett)**

2*b*. Body and head mostly blackish, distal two-thirds of caudal fin white; head with about four dark bands, one from mouth below eye across cheeks, one from rear of eye to upper part of opercle, one on top of snout past upper margin of eye to origin of spiny dorsal, one in middorsal line of head; margin of dorsal and anal with a black line, then submarginally pale, basal part of these fins spotted and barred; pectoral pale; pelvics dusky___________________________ **Coris gaimard (Quoy and Gaimard)**

TABLE 24.—*Counts made on three species of* Coris

Species	Number of fin rays								Number of rows of scales									Number of gill rakers on first gill arch				
	Dorsal		Anal				Pectoral															
	Spines	Soft rays	Spines	Soft rays														Above			Below	
	IX	12	III	11	12	13	12	13	58 59	60 61	62 63	64 65	66 67	68 69	70 71	72 73	74 75	6	7	8	10	11
angulata	2	2	2	---	1	1	--	2	1	1	1	---	---	---	---	---	---	--	--	1	1	--
gaimard	2	2	2	2	--	---	2	---	---	---	---	---	---	---	---	---	1	---	2	---	---	2
greenovi	1	1	1	---	1	---	1	---	---	---	---	---	---	---	---	---	1	1	---	---	1	---

CORIS ANGULATA Lacepède

Coris angulata LACEPÈDE, Histoire Naturelle des poissons, vol. 3, pp. 90, 96, pl. 4, fig. 2, 1802.

115534, Canton Island, reef at ocean, April 25-28, 1939, 1 specimen, 34.5 mm. in standard length.

115533, Rose Island, reef, June 11-14, 1939, 3 specimens.

CORIS GREENOVI (Bennett)

Julis greenovi BENNETT, Zool. Journ., vol. 4, p. 37, 1828.

52234, Apia, Samoa, Jordan and Kellogg, 1 specimen.

CORIS GAIMARD (Quoy and Gaimard)

Julis gaimard QUOY and GAIMARD, Voyage autour du monde . . . *Uranie*, Zool., p. 265, pl. 54, fig. 1, 1824.

115536, Tutuila Island, reef at Alofau, June 3, 1939, 1 specimen.

115535, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 1 specimen.

52228, Apia, Samoa, Jordan and Kellogg, 1 specimen.

Genus CYMOLUTES Günther

Cymolutes GÜNTHER, Catalogue of the Fishes of the British Museum, vol. 4, p. 207, 1862. (Type, *Julis praetextatus* Quoy and Gaimard.)

CYMOLUTES LECLUSE (Quoy and Gaimard)

Xyrichthys lecluse QUOY and GAIMARD, Voyage autour du monde . . . *Uranie*, Zool., p. 284, pl. 65, fig. 1, 1824.

115537, Canton Island, lagoon, May 25-26, 1939, 13 specimens, from coral sand around coral heads.

115538, Canton Island, lagoon, among coral heads, May 23-25, 1939, 4 specimens.

Genus LABROIDES Bleeker

Labroides BLEEKER, Nat. Tijdschr. Ned. Ind., vol. 2, p. 249, 1851. (Type, *Labroides paradiseus* Bleeker.)

LABROIDES DIMIDIATUS (Valenciennes)

Cossyphus dimidiatus VALENCIENNES, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 13, p. 136, 1839.

115539, Hull Island, channel, July 7-17, 1939, 1 specimen.

Family SCARIDAE

My material of this family is not very extensive, and since the life colors have faded it is not possible to identify some of the specimens with any degrees of certainty. I am listing those from the Phoenix and Samoan Islands mostly as studied by Jordan and Seale and later by Fowler, except where I do not agree with them.

Genus SCARUS Forskål

Callyodon GRONOW, Museum ichthyologicum . . ., vol. 1, p. 8, 1754 (not binomial).—SCOPOLI, Introductio ad historiam naturalem . . ., p. 449, 1777 (on Gronow).

Scarus FORSKÅL, Descriptiones animalium . . ., p. 25, 1775. (Type, *Scarus psittacus* Forskål, designated by Jordan, Rep. U. S. Fish Comm., vol. 13 (1885), p. 888, 1887.)

SCARUS VERMICULATUS (Fowler and Bean)

Callyodon vermiculatus FOWLER and BEAN, U. S. Nat. Mus. Bull. 100, vol. 7, p. 472, pl. 49, 1928.

115881, Enderbury Island, reef, May 15-19, 1939, 1 specimen.

SCARUS PECTORALIS Valenciennes

Scarus pectoralis VALENCIENNES, in Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 14, page. 269, 1839.

51758 (type of *Callyodon lazulinus* Jordan and Seale), Samoa, Jordan and Kellogg.

51826, 51832, 51837 (paratypes of *C. lazulinus* Jordan and Seale), Apia, Samoa, Jordan and Kellogg.

61170 (paratype of *C. lazulinus* Jordan and Seale), Samoa, Jordan and Kellogg.

SCARUS MICRORHINOS Bleeker

Scarus microrhinos BLEEKER, Nat. Tijdschr. Ned. Indie, vol. 6, p. 200, 1854 (Bleeker's Atlas pl. 3).

115882, Canton Island, lagoon, May 25, 1939, 2 specimens.

51757 (type of *C. ultramarinus* Jordan and Seale), Samoa, Jordan and Kellogg.

51835 (2 paratypes of *C. ultramarinus* Jordan and Seale), Pago Pago, Samoa, Jordan and Kellogg.

51838 (paratype of *C. ultramarinus* Jordan and Seale), Apia, Samoa, Jordan and Kellogg.

SCARUS DUBIUS Bennett

Scarus dubius BENNETT, Zool. Journ., vol. 4, p. 37, 1828.

52396, Pago Pago, Samoa, Jordan and Kellogg, 15 specimens.

52380, Apia, Samoa, Jordan and Kellogg, 1 specimen.

52368, Pago Pago, Samoa, Jordan and Kellogg, 3 specimens.
52279, Apia, Samoa, Jordan and Kellogg, 2 specimens.
51829, Apia, Samoa, Jordan and Kellogg, 1 specimen.

SCARUS DUSSUMIERI Valenciennes

Scarus dussumieri VALENCIENNES, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 14, p. 252, 1839.

My specimens are certainly like Bleeker's Atlas pl. 8, figure 1.

115879, Canton Island, lagoon, May 23–25, 1939, 2 specimens.
115880, Canton Island, lagoon, May 25, 1939, 2 specimens.
115876, Hull Island, reef, July 13, 1939, 1 specimen.
115878, Hull Island, channel, July 7–17, 1939, 2 specimens.

SCARUS PULCHELLUS Rüppell

Scarus pulchellus RÜPPELL, Neue Wirbelthiere zu der Fauna von Abyssinien gehörig, Fische, p. 25, pl. 8, fig. 3, 1835.

115877, Hull Island, reef, July 13, 1939, 1 specimen.

SCARUS JONESI (Streets)

Pseudoscarus jonesi STREETS, U. S. Nat. Mus. Bull. 7, p. 80, 1877.

The large specimens from Rose Island reef (U.S.N.M. No. 115875) are certainly the same species that Streets described.

115875, Rose Island, reef, June 11–14, 1939, 7 specimens.

The following young or half-grown specimens collected by me are referred with uncertainty to this species.

115873, Rose Island, reef, June 11–14, 1939; 6 specimens.
115874, Canton Island, lagoon, May 23–25, 1939, 4 specimens.
19221 (4 types of *Pseudoscarus jonesi* Streets), Palmyra Island, B. W. Streets.
51755 (type of *Callyodon latax* Jordan and Seale), Samoa, Jordan and Kellogg.
51834 (paratype of *C. latax* Jordan and Seale), Apia, Samoa, Jordan and Kellogg.

SCARUS PURPUREUS Valenciennes

Scarus purpureus VALENCIENNES, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 14, p. 277, 1839.

The following specimens certainly have a different type of coloring than others referred to *C. sordidus* by Fowler and Fowler and Bean. Jordan and Seale's figure 57,[23] is a fair representation of this species or type of coloring.

115872, Rose Island, lagoon, June 12 to 20, 1939, 2 specimens.
52224, Apia, Samoa, Jordan and Kellogg, 2 specimens.
52372, Apia, Samoa, Jordan and Kellogg, 2 specimens.

SCARUS OVICEPS Valenciennes

Scarus oviceps VALENCIENNES, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 14, p. 244, 1839.

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[23] Bull. U. S. Bur. Fish., vol. 25 (1905), p. 317, 1906.

The color of the following specimens is like that shown by Günther in his Fische der Südsee, plate 152, figure A.

52383, Apia, Samoa, Jordan and Kellogg, 5 specimens.
83415, Samoa, Wilkes Exploring Expedition, 2 specimens.

SCARUS CAUDOFASCIATUS (Günther)

Pseudoscarus caudofasciatus GÜNTHER, Catalogue of the fishes of the British Museum, vol. 4, p. 283, 1862.

The color of the following specimens certainly is like plate 153, figures A and B, in Günther's Fische der Südsee.

51752 (type of *C. zonularis* Jordan and Seale), Samoa, Jordan and Kellogg.

51821, 51825, 51828 (4 paratypes of *C. zonularis* Jordan and Seale), Pago Pago, Samoa, Jordan and Kellogg.

51827 (paratypes of *C. zonularis* Jordon and Seale), Apia, Samoa, Jordan and Kellogg.

SCARUS RUBROVIOLACEUS Bleeker

Scarus rubroviolaceus BLEEKER, Verh. Batav. Genoot., vol. 22, p. 52, 1849.

I am unable to verify the identification of the following specimens with this species because of the lack of definite color patterns. The teeth of our specimens are more exposed than in Bleeker's Atlas, plate 13, figure 3.

51749 (type of *C. ruberrimus* Jordon and Seale), Samoa, Jordan and Kellogg.
51751 (type of *C. upolensis* Jordan and Seale), Samoa, Jordan and Kellogg.

SCARUS SPINUS (Kner)

Pseudoscarus spinus KNER, Sitzb. Akad. Wiss. Wien, vol. 57, pt. 1, pp. 31, 354, pl. 9, fig. 27, 1868.

51746 (type of *Scarus kelloggi* Jordan and Seale), Samoa, Jordan and Kellogg.

SCARUS NUCHIPUNCTATUS Valenciennes

Scarus nuchipunctatus VALENCIENNES, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 14, p. 224, 1839.

51747 (type of *C maoricus* Jordan and Seale), Samoa, Jordan and Kellogg.

51833 (paratype of *C. maoricus* Jordan and Seale), Pago Pago, Samoa, Jordan and Kellogg.

SCARUS GLOBICEPS Valenciennes

Scarus globiceps VALENCIENNES, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 14, p. 242, 1839.

52367, Apia, Samoa, Jordan and Kellogg, 4 specimens with colors faded.

SCARUS FORSTERI Valenciennes

Scarus forsteri VALENCIENNES, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 14, p, 275, 1839.

51820, Pago Pago, Samoa, Jordan and Kellogg, 1 specimen.
51753, Samoa, Jordan and Kellogg, 1 specimen.
51824, Pago Pago, Samoa, Jordan and Kellogg, 1 specimen.

SCARUS GUTTATUS Bloch

Scarus guttatus Bloch, *in* Schneider, Systema ichthyologiae . . ., p. 294, 1801.

Color is same as shown on plate 161 in Günther's Fische der Südsee.

52389, Pago Pago, Samoa, Jordan and Kellogg, 2 specimens.

SCARUS DIMIDIATUS Bleeker

Scarus dimidiatus Bleeker, Act. Soc. Sci. Ind. Neerl., vol. 6, No. 2, p. (5) 17, 1859.

Color pattern as shown plate 16, figure 1, in Bleeker's Atlas.

51745 (type of *C. fumifrons* Jordan and Seale), Pago Pago, Samoa, Jordan and Kellogg.

SCARUS SORDIDUS Forskål

Scarus sordidus Forskål, Descriptiones animalium . . ., pp. X, 30, 1775.

Fowler has referred the following specimens to the synonymy of *Callyodon sordidus*. The color has faded so much on them now that it is not easy to verify the identifications.

51756 (type of *Callyodon cyanogrammus* Jordan and Seale), Samoa, Jordan and Kellogg.

51754 (type of *Callyodon abacurus* Jordan and Seale), Samoa, Jordan and Kellogg.

51822, 51830, 51831 (paratypes of *C. abacurus* Jordan and Seale), Apia, Samoa, Jordan and Kellogg.

51748 (type of *Callyodon pyrrhurus* Jordan and Seale), Samoa, Jordan and Kellogg.

51823, 51836 (paratypes of *Callyodon pyrrhurus* Jordan and Seale), Apia, Samoa, Jordan and Kellogg.

SCARUS ERYTHACUS (Jordan and Seale)

Callyodon erythacus Jordan and Seale, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 318, fig. 58, 1906.

This species resembles *C. dubius* and may be the same. The chief difference is the lack of pale lines on the abdomen, and only the upper edge of the pectoral base is blackish, in alcohol.

115871, Hull Island, reef, July 12–15, 1939, 1 specimen.

115870, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 9 specimens.

115867, Hull Island, channel, July 8–12, 1939, 5 specimens.

115868, Hull Island, channel, July 7–17, 1939, 6 specimens.

115869, Tutuila Island, reef at Alofau, June 3, 1939, 1 specimen.

115866, Rose Island, reef, June 11–14, 1939, 23 specimens.

51750 (type of *Callyodon erythacus* Jordan and Seale), Apia, Samoa, Jordan and Kellogg).

Order GOBIOIDEA

Authors interested in the South Pacific gobioids should carefully consider and examine the data presented in the keys to this group of fishes, because my examination of the type specimens of Jordan and

Seale and others in the National Museum has revealed some important characters heretofore completely overlooked. Thus major changes have resulted in the generic allocation of several species. The characters on which these changes depend are given in the rather detailed keys. Special reference should be made to *Stiphodon* and *Vailima; Chlamydes laticeps* Jenkins and *Bathygobius cotticeps* (Steindachner); *Eviota pruinosa* Jordan and Seale and *Pandaka; Rhinogobius muscarum* Jordan and Seale and *Glossogobius.*

KEY TO THE FAMILIES OF SOUTH PACIFIC GOBIOIDEA

1a. Last or inner rays of pelvic fins connected by a membrane for more than halfway out toward their tips; usually a basal membrane is present though not always; pelvics often cup-shaped------------------ **Gobiidae**

1b. Last or inner rays separated to their base and not connected by a membrane except at their bases; no basal membrane present and pelvics never cup-shaped-- **Eleotridae**

Family GOBIIDAE

KEY TO THE GENERA AND SPECIES OF GOBIIDAE, OR GOBIES WITH UNITED PELVIC FINS, FROM THE PHOENIX AND SAMOAN ISLANDS, BASED ON SPECIMENS IN THE NATIONAL MUSEUM

1a. Dorsal spines VI, second dorsal with about I, 7 to I, 14 rays; eyes not prominent above dorsal profile; no teeth on vomer or palatines.

  2a. Body entirely naked, no scales present anywhere, not even on posterior part of body; gill openings restricted mostly to opposite pectoral fin base.

    3a. Gill opening extends a trifle below lower ray of pectoral fin; pectoral fin rays 14 or 15; dorsal rays VI—I, 12 or I, 13; anal I, 8; lower jaw a trifle shorter than upper, gape almost in line with midaxis of body; teeth in a single row on each jaw; tongue rounded; caudal fin rounded; depth 5.5; head 4.5; snout rounded; body cylindrical. **Kelloggella cardinalis Jordan and Seale**

    3b. Gill opening in front of, and shorter than base of pectoral fin; pectoral fin rays 18 or 19; dorsal rays VI—I, 10; anal I, 8 or I, 9; lower jaw equal in length to upper jaw; gape longitudinal; teeth villiform in upper jaw in one row; lower jaw with an outer row of villiform teeth then an inner row with some canines, usually two pair rather strong near symphysis; caudal rounded; tongue rounded; depth 2.5; head 3⅓; body compressed (*Gobiodon*).

      4a. Opercle at upper posterior angle with a black spot, and usually in front and behind this spot a vertical line blue in life pale with black edges in alcohol; two more such lines usually visible below eye; posterior edge of spiny dorsal black; first rays of dorsal fin longest, the longest ray 1¼ in head; anal rays I,9; pectoral 18. **Gobiodon citrinus (Rüppell)**

      4b. No black spot or other markings; spiny dorsal 2¼ in head, posterior rays as long as anterior rays, but much shorter than soft dorsal rays; anal rays 1, 8, pectoral 19-- **Gobiodon rivulatus (Rüppell)**

  2b. Body scaly, at least behind head.

    5a. Head covered with hairlike dermal cirri, most numerous on underside of head and on isthmus; gill opening mostly restricted to in front of pectoral fin base, opening only a trifle below lowest pectoral ray;

upper jaw with an outer row of canine teeth and a narrow inner band of villiform teeth; lower jaw with an inner and an outer row of canine teeth separated by a narrow band of villiform teeth; near symphysis inner row of canines on lower jaw enlarged about 25 rows of scales along sides, eight or nine in a transverse series from origin of soft dorsal to anal; dorsal rays VI–I, 9; rarely I, 10; anal usually I, 9; pectoral 21; caudal fin round; tip of tongue round; snout about 1.2 in maxillaries; depth 3; head 2.9; mouth very oblique, the tip of lower jaw on lower level of eye when closed.

Paragobiodon echinocephalus (Rüppell)

5*b*. No cirri or hairlike dermal projections on head, and not otherwise as in 5*a*.

6*a*. Gill membranes continued far forward and narrowly attached to isthmus with or without a free fold across it.

7*a*. Gill membranes with a free fold across isthmus; a circular projection extends from upper iris over pupil a short distance; scale rows 30 to 32; 15 or 16 scales in front of dorsal fin, 8 in a transverse row from origin of soft dorsal to anal fin; cheeks and opercle naked; breast scaly; snout about 1.8 in maxillaries; tongue acutely bilobed; upper pectoral rays not silky; lower jaw much projecting, somewhat pointed; caudal round; dorsal rays VI—I, 9; anal I, 7 or I, 8; pectoral 16 or 17.

Glossogobius biocellatus (Valenciennes)

7*b*. Gill membranes without free fold across isthmus; no projection of iris over pupil; scales about 41 to 45; 11 or 12 in a transverse series; tongue trilobed, the middle of the tongue with a short point; cheeks, opercle and breast naked; lower jaw longer than upper; caudal rounded; pectoral rays 14; dorsal rays VI—I, 8; anal I, 8 instead of 7 as reported by Jordan and Seale; no teeth on vomer (teeth reported by Jordan and Seale).

Chaenogobius erythrops Jordan and Seale

6*b*. Gill membranes broadly to somewhat narrowly attached to isthmus but not carried far forward and no free fold across isthmus.

8*a*. A V-shaped notch at tip of lower jaw in thickened and hardened labial fold just within dermal part of lower lip; upper jaw with a similar labial fold, containing more conspicuous setiform teeth than lower labial fold; anteriorly basal membrane and front base of pelvic fins with a shallow cavity or pit; lower jaw inside labial fold with or without caninelike teeth; upper lip usually with a shallow notch and in some species a lateral notch in upper lip; tongue acutely rounded; lower jaw included; disk of pelvic fins cup-shaped; gill openings somewhat restricted to in front of pectorial fin base, opening extending only a little below lowest ray; upper pectoral rays not divided and "silky" (SICYIDINAE).

9*a*. Scale rows number about 54 or 55 from upper edge of gill opening to base of caudal fin; labial teeth of upper jaw with tricuspid tips, inner cusp a little shorter and narrower than outer cusps; cheeks, opercle, and breast naked; upper lip with three notches, one in midline and one in middle of each side; behind each notch a small papilla, then a row of papillae around inside of upper lip next to labial teeth; two or three pairs of canines in lower jaw, pair next to symphysis strongest; edge of groove around snout blackish; a black bar under eye to mouth; dorsal edges of caudal fin pale, then submarginally a lengthwise black streak more or less fusing with darker color of posterior margin of caudal fin; number of scales in a transverse series 16; dorsal rays VI—I, 11; anal I, 10; pectoral 18 or 19; third ray of dorsal elongate on adults at least--------------------- Sicyopterus taeniurus[24] (Günther)

9*b*. Scale rows 35 or 36; before dorsal 12 to 15 scales; scales in a transverse row from origin of dorsal to anal fin 9; cheeks, opercle, and breast naked; upper lip with a shallow notch in midline but no papilla associated with it; no lateral notches in lips; lower jaw with three pairs of canines inside labial fold containing teeth; upper labial fold with setiform teeth, their tips tricuspid, middle cusp long, outer cusps very short, only at base of middle cusp; dorsal rays VI–1, 9; anal I, 10; pectoral rays about 14; midsides of body with about 12 brown blotches more or less joined together and continuing in front of pectoral as a band to tip of snout; above brown spots a pale streak continuing to eye and below them under side of body pale; along back a darker streak (pronounced in young and more diffuse on adults) and passing through interorbital space along edge of eye, then meeting its fellow at front of snout; a pale area separating blackish band on top of snout, band passing below level of eye to snout; median fins barred.
Stiphodon elegans (Steindachner)

8*b*. No V-shaped notch at tip of lower jaw and no labial fold inside of lips containing teeth; no pit in anterior base of pelvics in basal membrane.

10*a*. Upper pectoral rays divided, free, hairlike or "silky," as contrasted with lower rays joined by membrane to each other; gill membranes broadly joined to isthmus; upper and lower jaws of about equal length; caudal fin rounded, not lanceolate; breast scaly; no fleshy flaps on shoulder girdle under gill cover.

11*a*. Tongue strongly bilobed; outer teeth of both jaws somewhat enlarged and caninelike; inside of outer teeth is a band of villiform teeth with a few enlarged along inner edge.

12*a*. Free edge of basal membrane of pelvic fins definitely trilobed (two lateral points and a middle projection); five or six of upper rays of pectoral fin branched and silky; scale rows from upper edge of gill opening to base of caudal fin 34 to 36; 13 scales in a transverse series and

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[24] An examination of the labial teeth in the upper jaw of *Sicyopterus stimpsoni* Gill reveals that they differ in structure from those of *S. taeniurus*. *S. stimpsoni* has bilobed teeth; the outer two cusps are enlarged and the usual inner one lacking.

I have examined a very large series of *S. tauae* Jordan and Seale collected by the Wilkes Exploring Expedition in Tahiti and another large series consisting of several hundred specimens collected by J. Morgan Clements in Tahiti. Although most of these lack canine teeth on the lower jaw, a few have one or two canines very feebly developed; the notches in the upper lip are also feebly developed in *tauae*, and all the specimens of *tauae* in the National Museum are young, under 35 mm. in standard length. Thus it appears that the notches develop in the lips at about 30 to 35 mm. and the canines in the lower jaw at sizes greater than 30 to 35 mm. Therefore I refer *S. tauae* to the synonymy of *taeniurus*. The scale rows on the sides of both species number about 54 to 56.

Mr. Clements states that these small fishes appear in enormous numbers during the first half of November and early December of each year and go into the mouths of the rivers. At first they are practically transparent, but in a few days, especially after they have returned to the sea, they become darker. They are caught with nets and are a great delicacy.

about 20 in front of dorsal; dorsal rays VI–I, 9; anal I, 8; pectoral 19 or 20; cheeks naked; a few scales on dorsal edge of opercle.
Bathygobius crassiceps (Jordan and Seale)

12*b*. Free edge of basal membrane, definitely bilobed (no projection at middle of free edge, only at sides).

13*a*. Scale rows 34 or 35 between gill opening and base of caudal fin; 17 scales in front of dorsal fin and 10 in a transverse series; cheeks and opercle naked; three or four of upper rays of pectoral fin branched and silky; dorsal rays VI–I, 9; anal I, 8; pectoral 18 or 19; color characteristically of broken lengthwise lines.
Bathygobius fuscus swainsensis, new subspecies

13*b*. Scale rows 37 to 40, usually 38 or 39; 21 to 23 scales in front of dorsal fin.

14*a*. About eight of upper rays of pectoral fin branched and silky; opercle scaled; cheek scaled in its upper or dorsal part; 15 scales in a transverse row; pectoral rays 24; dorsal VI–I, 9; anal I, 6 or I, 7.
Bathygobius cotticeps (Steindachner)

14*b*. About four of upper rays of pectoral fin branched and silky; cheeks naked; opercle naked (rarely any scales on its dorsal edge); 12 or 13 scales in a transverse series; pectoral rays 18 or 19; dorsal VI–I, 8; anal I, 8---------- **Bathygobius fuscus fuscus** (Rüppell)

11*b*. Tongue truncate; a band of villiform teeth in both jaws without enlarged ones on inner and outer edges; scales in about 28 rows; 12 or 13 in front of dorsal and 9 in a transverse series; cheeks and opercle naked; about three or four of upper rays of pectoral fin branched and silky; dorsal rays VI–I, 10; anal I, 9, or I, 10; pectoral 19; three or four irregular rows of spots arranged in lengthwise series.
Gobius ornatus Rüppell

10*b*. Upper pectoral rays not divided, elongate and silky.

15*a*. About three to six well-developed fleshy flaps on shoulder girdle concealed by operculum; scale rows about 48 to 60; anal rays 12; pectoral 15 or 16; dorsal rays VI–I, 10 or I, 11; breast scaly.

16*a*. Inside of mouth papillate; scale rows about 57: 18 or 19 scales in front of dorsal fin and 14 in a transverse series; upper part of cheek scaly; upper part of opercle scaly; snout longer than maxillaries; tongue bilobed; lower jaw a little longer than upper; caudal rounded.
Chonophorus ocellaris (Broussonet)

16*b*. No papillae on inside of mouth; scale rows about 50; 15 or 16 scales in front of dorsal and 11 or 12 in a transverse series; cheek naked; upper part of opercle with small patch of scales; snout from 1.3 to 1.7 in maxillaries (mouth longer on males); tongue weakly bilobed; jaws equal; caudal weakly pointed; a black bar under eye; sides of body with 10 or 11 narrow brown bars.
Chonophorus genivittatus (Valenciennes)

15*b*. No well-developed fleshy flaps on shoulder girdle.

17*a*. Tongue bilobed or if tongue is weakly bilobed or truncate cheeks definitely scaly; caudal rounded.

18*a*. Cheeks, opercles, and nape scaly; breast scaly; scale rows about 27 to 32; 8 to 10 in front of dorsal and 7 to 9 in transverse series; snout about 1.1 in maxillaries; lower jaw equal or slightly shorter than upper jaw; pectoral rays 15 or 16; dorsal rays VI–I, 10 or I, 11.

19*a*. Scale rows 29 to 31; scales before dorsal 9 or 10; number of scales in a transverse series 9; tongue strongly bilobed; lower jaw slightly shorter than upper; dorsal rays VI–I, 11; anal I, 11; a black bar below eyes across front of cheek; this streak intense brown over each eye; no lengthwise streak on opercle.
Gnatholepis anjerensis (Bleeker)

19*b*. Scale rows 28 or 29; scales before dorsal 9; number of scales in a transverse series about 8; tongue bilobed (moderately); jaws equal in length; dorsal rays VI–I, 11; anal I, 10; a brown bar below each eye and a lengthwise one across opercle; a brown blotch above pectoral base; a brown streak across pectoral base; six blotches on midsides; a brown blotch in front of base of spiny dorsal on midline of back_____ **Gnatholepis knighti** Jordan and Evermann

19*c*. Scale rows 28 or 29; scales before dorsal 8; number of scales in a transverse series about 8; tongue weakly bilobed or truncate; lower jaw slightly shorter than upper; dorsal rays VI–I, 10 or I, 11; anal I, 9; no narrow black streak below eyes across front of cheek, but a brown blotch below each eye, more or less divided by a pale area; six brown blotches on middle of sides; a brown blotch on opercle; two streaks (lengthwise) on base of pectoral, lower shorter; under side of lower jaw with pigment cells.
Gnatholepis hololepis, new species

18*b*. Cheeks and opercles naked; midline in front of dorsal naked, only a few scales posteriorly on head above pectoral base; about 11 scales in a transverse series and 34 scale rows on side of body; jaws equal; dorsal rays VI–I, 10; anal I, 8; pectoral 15.
Rhinogobius corallinus Jordan and Seale

17*b*. Tongue truncate or rounded; no scales of cheeks; caudal rounded or lanceolate.

20*a*. First ray of both dorsal fins not conspicuously enlarged and spinous, not stronger than other rays; preopercle with or without spines on its posterior edge.

21*a*. Fewer than 42 scale rows from gill opening to base of caudal fin.

22*a*. Length of snout contained in length from tip of snout to posterior tip of maxillaries fewer than two times and not extending behind eye; caudal fin rounded, not pointed posteriorly or lanceolate.

23*a*. Midline of nape in front of dorsal fin naked.

24*a*. Directly behind each eye a conspicuous oval brown spot occupying nearly half of distance from eyes to origin of dorsal fin; basal membrane of pelvic fins rudimentary; inner rays of pelvics joined by membrane for about two-thirds way out toward their tips; cheeks, opercle, breast, and region in front of dorsals naked; a more or less obvious pigment area or band across cheek; a small brown spot at base of lower pectoral ray; a wide bar under spiny dorsal and, another under soft dorsal and two behind it; base of caudal fin rays with a brown blotch; no pigment spots along mid-ventral line behind anal origin; depth 5.3; snout 1.3 in eye; snout 4.66 in head; eye 1.2 in maxillaries; eye 3.5 in head; dorsal rays VI–I, 8; anal I, 7; pectoral 14 or 15; scales about 30; pelvics I, 5.
Pandaka pruinosa (Jordan and Seale)

24*b*. No large black spots on dorsal surface of head behind eyes; basal membranes of pelvics not rudimentary.

25*a*. Scale rows fewer than 30; usually 23 to 29.

26*a*. Breast scaly.

27*a*. No alternating vertical black and white bars anywhere; sides of head above operculum or each side of nape scaly but midline of nape naked; 23 to 26 scale rows, six or seven in a transverse series; snout about as long as maxillaries; lower jaw longer than upper jaw; dorsal rays VI–I, 9; anal I, 8; pectoral 16 to 18; a V-shaped color marking on top of snout; one or two more or less distant spots on midaxis posteriorly on caudal peduncle.
Fusigobius neophytus (Günther)

27b. Alternating vertical pale and dark bars, two below eye, and two more across operculum, one across pectoral base, three or four under spinous dorsal, those posteriorly faint or absent; no scales on sides of nape; about 27 scale rows, 10 or 11 in a transverse series; snout about 1.7 in maxillaries; lower jaw longer; dorsal rays VI–I, 9; anal I, 7; pectoral 18.
Zonogobius semidoliatus (Valenciennes)

26*b*. Breast naked; no alternating vertical pale and dark bars; 27 or 28 scale rows, 8 or 9 in a transverse series, no scales on nape or sides of nape; snout about 1.5 times in maxillaries; dorsal rays VI–I, 9; anal I, 8; pectoral 18 or 19; a black bar across base of caudal fin; upper rays of caudal fin

blackish; a blackish blotch near base of rays of spiny dorsal.
Rhinogobius tongarevae (Fowler)

25*b*. About 32 scale rows, 13 in a transverse series; breast scaly; sides of nape mostly naked only a few scales above gill opening; snout equal to length of maxillaries; jaws equal; dorsal rays VI–I, 9; anal I, 9; pectoral 18; first rays of spiny dorsal somewhat elongate.
Rhinogobius nebulosus (Forskål)

23*b*. Midline of nape in front of dorsal fin scaled.

28*a*. About 11 or 12 vertical brown bars, with pale interspaces a little narrower; pores not strongly elevated to form ridges; about 38 to 40 scale rows, 12 or 13 in a transverse series; about 15 scales in front of dorsal fin; upper part of cheek with a few scales, and a few more scales on upper part of opercle; breast scaly; sides of nape scaly; lower jaw a little longer than upper jaw; dorsal rays VI–I, 11; anal I, 10; pectoral 19_ **Pleurogobius naraharae (Snyder)**

28*b*. No vertical dark bars.

29*a*. Elevated ridges of pores on head; 23 scale rows, about 8 in a transverse series; cheeks naked; opercle with a few scales dorsally; breast scaly; sides of nape scaly; lower jaw longest, mouth oblique; dorsal rays VI–I, 7; anal I, 7; pectoral 18.
Drombus tutuilae Jordan and Seale

29*b*. No elevated ridges of pores, pores in normal rows; scale rows about 37 to 39, about 21 scales in front of dorsal and 10 or 11 in a transverse series; a few scales on upper part of opercle, but cheeks naked; breast scaly; a black blotch over pectoral base; dorsal rays VI–I, 8; anal I, 8; pectoral 16 (obsolete dermal flaps appear on shoulder girdle of some specimens).
Vaimosa fontinalis Jordan and Seale

22*b*. Snout contained more than two times in maxillaries, latter extending behind posterior margin of eye; about 26 or 27 scale rows, 8 or 9 in a transverse series; cheeks and opercles naked.

30*a*. Midline of nape in front of dorsal and sides of nape naked; breast naked; caudal fin lanceolate, middle rays greatly elongate; maxillaries very elongate, reaching posterior margin of preopercle; black band below eye and about six dark blotches along midaxis of body; pelvics blackish; dorsal rays VI–I, 10; anal I, 11; pectoral 19.
Waitea stomias H. M. Smith

30*b*. Midline of nape in front of dorsal with 8 or 9 scales, sides of nape scaly; breast scaly; caudal fin posteriorly pointed; maxillaries reaching a little over halfway across cheek but not to rear edge of preopercle; ventral margin of body with six black blotches; a black V-shaped spot at base of caudal fin; pelvics dark; dorsal rays VI–I, 7; anal I, 6; pectoral 16.

Mahidolia pagoensis, new species

21*b*. More than 50 scale rows from gill opening to base of caudal fin; breast scaly.

31*a*. Midline of nape in front of dorsal fin naked, but sides of nape scaly; cheeks and opercles naked; maxillaries extend to rear of eye.

32*a*. Tentacle on upper part of eye; 54 scale rows, 16 in a transverse series; jaws equal; tongue rounded: caudal fin lanceolate; dorsal rays VI–I, 12; anal I, 12 or I, 13; pectoral 19; snout contained about 1.8 times in maxillaries.

Oxyurichthys tentacularis (Valenciennes)

32*b*. No tentacle on eye; 70 to 80 scale rows, 24 in transverse series; lower jaw a little shorter than upper jaw; tongue truncate; caudal rounded; dorsal rays VI–I, 10; anal I, 10; pectoral 15; snout contained about 2.1 times in maxillaries.

Oxyurichthys papuensis (Valenciennes)

31*b*. Nape or midline in front of dorsal scaled and sides of nape scaled; caudal fin rounded; no tentacle over eye; tongue rounded; maxillaries do not quite extend to rear of eye.

33*a*. Scale rows 62; 20 scales in front of dorsal and 18 in a transverse series; cheeks and opercles naked; dorsal rays VI–I, 10; anal I, 9; pectoral 16; distinct cross-lines of pores on head; no vertical color bar___ **Mars strigilliceps** Jordan and Seale

33*b*. Scale rows 55 to 57; 25 scales in front of dorsal fin and 19 or 20 in a transverse series; cheeks naked; opercles scaly; jaws equal; dorsal rays VI–I, 14; anal I, 13 or I, 14; pectoral 19; about five double brownish color bars behind head, seldom lacking; caudal fin with one or two black spots in upper rays.

Amblygobius phalaena (Valenciennes)

20*b*. First ray of both dorsal fins conspicuously spinous and stronger than other rays; cheeks and opercles naked; breast scaly; midline and sides of nape scaly; tongue truncate; abdomen scaly; gill membranes broadly joined to isthmus; maxillaries reach to front of eye; no spines on rear edge of opercle; dorsal rays V–I, 10; anal I, 10; pectoral 18; scale rows 28 and before dorsal 10; eight scales in transverse row.

Oplopomus diacanthus, new species

1b. Dorsal rays XIV–or XV–I, 11 to I, 13; anal I, 10 to I, 12; pectoral about 13; eyes prominent on top of head, much above profile; scales 82 to 88

Periophthalmus koelreuteri (Pallas)

Genus KELLOGGELLA Jordan and Seale

Kelloggella JORDAN and SEALE, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 409, 1906. (Type *Kelloggella cardinalis* Jordan and Seale.)

KELLOGGELLA CARDINALIS Jordan and Seale

Kelloggella cardinalis JORDAN and SEALE, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 409, pl. 43, fig. 1, 1906.

51785 (type and paratype of *Kelloggella cardinalis* Jordan and Seale), Pago Pago, Samoa.

Genus GOBIODON Bleeker

Gobiodon BLEEKER, Nat. Tijdschr. Ned. Ind., vol. 11, p. 407, 1856. (Type, *Gobius histrio* Cuvier and Valenciennes.)

I refer as a synonym *Pseudogobiodon* Bleeker because I fail to see any fundamental difference in the dentition, thus concurring in the opinion of McCulloch and Ogilby, 1917-1921.

GOBIODON CITRINUS (Rüppell)

Gobius citrinus RÜPPELL, Neue Wirbelthiere zu der Fauna von Abyssinien gehörig, Fische, p. 139, pl. 32, fig. 4, 1835.

116137, Tutuila Island, reef at Alofau, June 3, 1939, 2 specimens.
116136, Tutulia Island, reef at entrance Pago Pago Bay, 9 specimens.
52212, Apia, Samoa, Jordan and Kellogg, 6 specimens.
15114, Samoan Island, A. B. Steinberger, 4 specimens.
52249, Apia, Samoa, Jordan and Kellogg, 1 specimen.

GOBIODON RIVULATUS (Rüppell)

Gobius rivulatus RÜPPELL, Atlas zu der Reise im nördlichen Afrika, Fische, p. 136, 1828.

116122, Rose Island, reef, June 11-14, 1939, 8 specimens.
116123, Rose Island, lagoon, June 12-20, 1939, 1 specimen.
20511, Samoa Islands, A. B. Steinberger, 2 specimens.

Genus PARAGOBIODON Bleeker

Paragobiodon BLEEKER, Ned. Tijdschr. Dierk., vol. 4, p. 129, 1873; Arch. Neerl. Sci. Nat., vol. 9, p. 309, 1874. (Type, *Gobius echinocephalus* RÜPPELL.)

PARAGOBIODON ECHINOCEPHALUS (Rüppell)

Gobius echinocephalus RÜPPELL, Atlas zu der Reise im nördlichen Afrika, Fische, p. 136, pl. 34, fig. 3, 1828.

116121, Tutuila Island, reef at entrance Pago Pago, June 2, 1939, 1 specimen.
52254, Apia, Samoa, Jordan and Kellogg, 6 specimens.
15113, Samoan Island, A. B. Steinberger, 6 specimens.
82955, Samoa, Wilkes Exploring Expedition, 3 specimens.

Genus GLOSSOGOBIUS Gill

Glossogobius GILL, Ann. Lyc. Nat. Hist. vol. 7, p. 46, 1862. (Type *Gobius platycephalus* Richardson.)

GLOSSOGOBIUS BIOCELLATUS (Valenciennes)

Gobius biocellatus VALENCIENNES, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 12, p. 73, 1837.

Glossogobius vaisiganis JORDAN and SEALE, Bull. U. S. Bur. Fish., vol. 22 (1905), p. 403, 1906.

116120, Tutuila Island, stream at village of Pago Pago, June 2, 1939, 1 specimen.

51774 (type and paratype of *G. vaisiganis* Jordan and Seale), Vaisigano River, Apia, Samoa, Jordan and Kellogg.

51782 (type and paratype of *Rhinogobius muscarum* Jordan and Seale), Pago Pago, Samoa, Jordan and Kellogg.

Much to my surprise, I find the gill membranes of *R. muscarum* Jordan and Seale (*loc. cit.*, p. 401), attached far forward and with a free fold across the isthmus. Jordan and Seale's figure 90 has the lower jaw too short, for it is almost as long as the upper, on the type, now in poor condition. Thus I must refer these small types to the synonymy of *G. biocellatus*.

Genus CHAENOGOBIUS Gill

Chaenogobius GILL, Ann. Lyc. Nat. Hist., vol. 7, p. 12, 1862. (Type, *Chaenogobius annularis* Gill.)

CHAENOGOBIUS ERYTHROPS Jordan and Seale

Chaenogobius erythrops JORDAN and SEALE, Bull. U. S. Bur. Fish., vol. 25, p. 404, pl. 37, fig. 3, 1906.

51781 (type of *Chaenogobius erythrops* Jordan and Seale), Pago Pago, Samoa, Jordan and Kellogg.

Genus SICYOPTERUS Gill

Sicyopterus GILL, Proc. Acad. Nat. Sci. Philadelphia, 1860, p. 101. (Type, *Sicydium stimpsoni* Gill.)

SICYOPTERUS TAENIURUS (Günther)

Sicydium taeniurum GÜNTHER, Journ. Mus. Godeffroy, vol. 6, pt. 11, p. 183, pl. 112, fig. C, 1877.

116119, Tutuila Island, creek near Village at Fagasa Bay, June 5, 1939, 9 specimens.

52261, Pago Pago, Samoa, Jordan and Kellogg, 1 specimen.

51787 (type of *Sicyopterus tauae* Jordan and Seale), Apia, Samoa, Jordan and Kellogg.

Genus STIPHODON Weber

Stiphodon WEBER, *in* Semon, Zoologische Forschungsreisen . . ., vol. 5, p. 269, 1895. [Type, *Stiphodon semoni* Weber (= *Sicydium elegans* Steindachner).]

Vailima JORDAN and SEALE, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 398, 1906. (Type, *Vailima stevensoni* Jordan and Seale.)

STIPHODON ELEGANS (Steindachner)

Sicydium elegans STEINDACHNER, Sitzb. Akad. Wiss. Wien, vol. 80, pt. 1, p. 152, 1879 (1880).

Vailima stevensoni JORDAN and SEALE, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 398, fig. 87, 1906.

51775 (type and 6 paratypes of *Vailima stevensoni* Jordan and Seale), Gasegase River at Vaimosa near Apia, Samoa, Jordan and Kellogg.

The failure of Jordan and Seale to refer their genus and species to the Sicydinae is not understood by me. The characters given in the key to the gobies clearly indicate the relationships of *Vailima stevensoni.*

Genus BATHYGOBIUS Bleeker

Bathygobius BLEEKER, Arch. Neerl. Sci. Nat., vol. 13, p. 54, 1878. (Type, *Gobius petrophilus* Bleeker.)

BATHYGOBIUS CRASSICEPS (Jordan and Seale)

Mapo crassiceps JORDAN and SEALE, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 403, fig. 92, 1906.

116125, Tau Island, reef at Siulagi Point, June 27, 1939, 1 specimen.

116124, Tutuila Island, reef at Alofau, June 3, 1939, 6 specimens.

51777 (type and 4 cotypes of *Mapo crassiceps* Jordan and Seale), mouth of Vaisigano River, Apia, Samoa, Jordan and Kellogg.

BATHYGOBIUS FUSCUS SWAINSENSIS, new subspecies

FIGURE 18

Holotype.—A male (U.S.N.M. No. 116117) 64 mm. in standard length, collected on Swains Island in Lake Namo, a fresh-water (at surface) lake, by Leonard P. Schultz, on May 5, 1939, along with 17 paratypes (U.S.N.M. No. 116118) 12.5 to 33.7 mm. in standard length, bearing same data. The fresh-water lake has been cut off from the sea for many years; however, Mr. Jennings' grandfather said that there was a small outlet when he first arrived, but this is now closed. Sea water spills into the lake when a severe hurricane strikes the island, as occurred in January 1915 and again in 1936. Saltwater fishes (barracuda) were found in the lake after the 1915 storm, but they soon died.

Description.—(Based on the holotype and 17 paratypes listed above. All measurements are recorded in hundredths of the standard length, 64 mm. (33.7 ♂; 32.2 ♀ mm.). Counts and measurements for the holotype are given first followed by those for paratypes in parentheses, respectively.) Length of head 33.6 (31.2; 33.0); greatest depth 18.0 (18.7; 23.4); diameter of eye 8.1 (8.9; 9.6); distance from tip of snout to rear edge of maxillaries 14.8 (13.0; 12.1); length of snout 9.7 (8.9; 8.4); postorbital length of head 19.1 (14.9; 15.8); least width of preorbital 2.8 (2.4; 2.5); length of caudal peduncle 22.6 (24.4; 23.6); least depth of caudal peduncle 12.5 (12.8; 12.4); tip of snout to origin of dorsal fin 40.0 (37.7; 38.8); snout to origin of anal fin 61.0 (61.0; 60.0); snout to anus 54.7 (52.6; 55.0);

longest (2nd or 3rd) spine of dorsal 17.2 (16.9; 17.9); longest (third from last) soft ray of dorsal 21.2 (21.7; 16.5); longest (third from last) soft ray of anal fin 22.0 (19.6; 18.1); longest (middle) ray of caudal fin 32.4 (30.0; 29.8); longest pectoral fin ray 26.6 (27.3; 28.0); longest pelvic fin ray 23.0 (23.2; 23.9).

Dorsal fin rays VI–I, 9 (VI–I, 9; VI–I, 9; VI–I, 9; VI–I, 9); anal fin rays I, 8 (I, 8; I, 8; I, 8; 1, 8); pectoral fin rays 18–19 (19–19; 20–20; 18–19; 20–19; 19); pelvic rays always I, 5; number of upper rays of pectoral fin that are branched and silky (elongate ends of rays detached) 3–3 (3–3; 4–4; 3–3; 4–4); number of scale rows from upper edge of gill opening to base of caudal fin 35 (34; 35; 33; 33; 34); number of scales in front of dorsal fin 18 (18; 16; 17; 16); number of scales in a transverse series from base of first soft ray of dorsal to anal fin 10 (10; 9; 10; 10; 10). In one paratype I counted 1+9 gill rakers on the first gill arch.

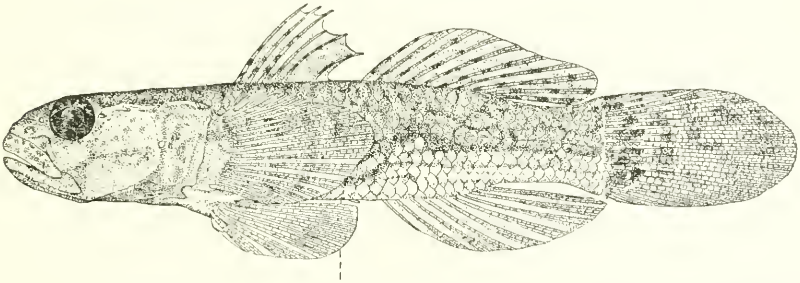

FIGURE 18.—*Bathygobius fuscus swainsensis*, new subspecies: Holotype (U.S.N.M. No. 116117), 64 mm. in standard length.

Color, brown blotches anteriorly on upper part of head and body, arranged posteriorly and ventrally in lengthwise brown streaks, three on the caudal peduncle; undersides of head and body with fine black pigment cells; dorsals, caudal, and pectorals barred, pelvics and anal plain, except margin and anal whitish, then blackish submarginally, anterior nostril tubular, posterior nostril with a slightly raised rim; basal membrane with a notch just before joining the first soft pelvic ray; gill membranes broadly attached to the isthmus, the first branchiostegal ray with a back extension that forms a notch between it and the attachment of the gill membrane to the isthmus; caudal fin rounded; third from last soft rays of dorsal and anal fins longest; jaws of equal length, the maxillary extending to under front of pupil; cheeks and opercles naked; breast scaly; nape scaly but the scales do not quite reach the eyes and appear embedded anteriorly; tongue bilobed; and outer series of canine teeth on both jaws anteriorly, with an inner band of villiform teeth, with the inner row of this band a little enlarged; pelvic fins joined together along their entire length but free from the body, the basal membrane well developed, the sucking disk oval, not circular.

Remarks.—This subspecies may be recognized by its fewer number of scale rows, 33 to 35, instead of 36 to 39, in combination with the color pattern of lengthwise brown streaks on the lower and posterior sides of the body; other differences between typical *B. fuscus fuscus* and the new subspecies are presented in the table 25.

TABLE 25.—*Counts made on the subspecies of* Bathygobius fuscus *from the Phoenix and Samoan Islands*

Character	*B. f. fuscus*	*B. f. swainsensis*	Character	*B. f. fuscus*	*B. f. swainsensis*
Dorsal spines VI	11	6	Scale rows:		
Second dorsal I, 9	11	6	33	----------	2
Anal rays I, 8	8	6	34	----------	2
Pectoral rays:			35	----------	2
18	7	2	36	----------	----------
19	6	6	37	4	----------
20	----------	3	38	7	----------
Silky rays of pectoral:			39	2	----------
3	----------	6	Scales in transverse row:		
4	3	4	9	----------	1
5	5	----------	10	1	5
6	1	----------	11	3	----------
			12	3	----------
			13	1	----------

Named *swainsensis* in reference to Swains Island, one of the Samoan group, where it was collected in the fresh waters of Lake Namo.

BATHYGOBIUS COTTICEPS (Steindachner)

Gobius cotticeps STEINDACHNER, Sitzb. Akad. Wiss. Wien, vol. 80, pt. 1, p. 137, pl. 1, figs. 2a, 1879 (1880).

Chlamydes laticeps JENKINS, U. S. Fish. Comm. Bull., vol. 22 (1902), p. 503, fig. 43, 1903.

116127, Tau Island, reef at Siulagi Point, June 27, 1939, 1 specimen.

I also collected one specimen of this species (No. 116128) at Kaneohe Bay, Oahu, April 13, 1939.

BATHYGOBIUS FUSCUS FUSCUS (Rüppell)

Gobius fuscus RÜPPELL, Atlas zu der Reise im nördlichen Afrika, Fishe, p. 137, 1828.

116134, Tutuila Island, Fagasa Bay, rockpools, June 5, 1939, 1 specimen.

116131, Swains Island, reef, May 3–9, 1939, 1 specimen.

116133, Canton Island, reef of widest shallow channel, May 13, 1939, 1 specimen.

116129, Enderbury Island, reef, May 15–19, 1939, 5 specimens.

116135, Canton Island, reef at ocean, April 25–28, 1939, 36 specimens.

116130, Tutuila Island, reef at Alofau, June 3, 1939, 3 specimens.

52235, Apia, Samoa, Jordan and Kellogg, 12 specimens.

56991, Apia, Samoa, Jordan and Kellogg, 12 specimens.

Genus GOBIUS Linnaeus

Gobius Linnaeus, Systema naturae, ed. 10, p. 262, 1758. (Type, *Gobius niger* Linnaeus.)

GOBIUS ORNATUS Rüppell

Gobius ornatus Rüppell, Atlas zu der Reise im nördlichen Afrika, Fische, p. 135, 1828.

52266, Pago Pago, Samoa, Jordan and Kellogg, 4 specimens.

Genus CHONOPHORUS Poey

Chonophorus Poey, Memorias sobre la historia natural de la isla de Cuba . . . vol. 2, p. 274, 1856–1858. (Type, *Chonophorus bucculentus* Poey.)

CHONOPHORUS OCELLARIS (Broussonet)

Gobius ocellaris Broussonet, Ichthyologia, sistens piscium descriptiones et icones, p. and pl., 1782.

52381, Apia, Samoa, Jordan and Kellogg, 5 specimens.
38289, Pago Pago, Samoa, Dr. W. H. Jones, 1 specimen.

CHONOPHORUS GENIVITTATUS (Valenciennes)

Gobius genivittatus Valenciennes, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 12, p. 64, 1837.

52231, Apia, Samoa, Jordan and Kellogg, 3 specimens.

Genus GNATHOLEPIS Bleeker

Gnatholepis Bleeker, Arch. Neerl. Sci. Nat., vol. 9, p. 318, 1874. (Type, *Gobius anjerensis* Bleeker.)

GNATHOLEPIS ANJERENSIS (Bleeker)

Gobius anjerensis Bleeker, Nat. Tijdschr. Ned. Ind., vol. 1, p. 251, fig. 11, 1850.

52241, Apia, Samoa, Jordan and Kellogg, 5 specimens.

GNATHOLEPIS KNIGHTI Jordan and Evermann

Gnatholepsis knighti Jordan and Evermann, Bull. U. S. Fish. Comm., vol. 22 (1902), p. 204, 1903.

116115, Hull Island channel, July 8–12, 1939, 1 specimen.

GNATHOLEPIS HOLOLEPIS, new species

Figure 19.

Holotype.—A specimen (U.S.N.M. No. 116110) 33.4 mm. in standard length taken May 25–26, 1939, by Leonard P. Schultz in the lagoon of Canton Island, along with five paratypes (U.S.N.M. No. 116112) bearing same data, 26.8 to 41.0 mm. in standard length.

Description.—(Based on the holotype and five paratypes listed above. All measurements are recorded in hundredths of the standard length, 33.4 mm. (36.2; 26.8 mm.), those for the holotype first, followed by those for two paratypes in parentheses, respectively.) Length of head 29.6 (29.3; 31.0); greatest depth 17.6 (19.9; 17.5); diameter of eye 8.1 (8.3; 10.1); distance from tip of snout to rear edge of maxillaries 9.6 (10.0; 9.7); length of snout 9.6 (9.7; 9.3); postorbital length of head 13.8 (13.8; 13.4); least width of preorbital 4.8 (5.0; 5.6); length of caudal peduncle 23.0 (25.7; 23.9); least depth of caudal peduncle 11.4 (11.0; 11.4); tip of snout to origin of dorsal fin 36.0 (37.6; 36.6; snout to origin of anal fin 56.2 (54.6; 59.0); snout to anus 48.4 (50.0; 53.0); longest (second or third) spine of first dorsal fin 16.4 (16.8; 18.6); longest (second or third) soft ray of dorsal fin 16.4 (17.9; 20.5); longest (sixth or seventh) ray of anal fin 17.4 (16.3; 16.8); longest (middle) ray of caudal fin 29.3 (26.0; 31.7); longest pectoral fin ray 24.5 (25.1; 26.8); longest pelvic fin ray 23.9 (24.3. 25.0).

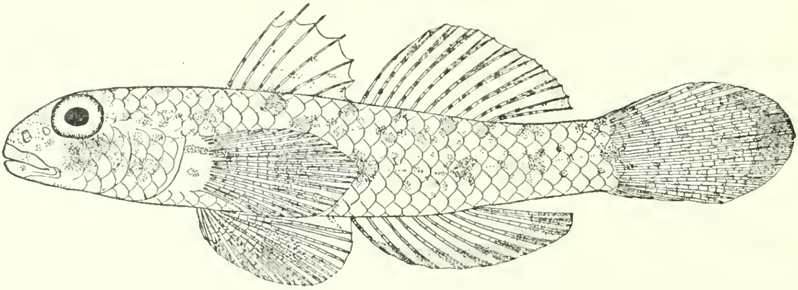

Figure 19.—*Gnatholepis hololepis*, new species: Holotype (U.S.N.M. No. 116110), 33.4 mm. in standard length.

Dorsal fin rays VI–I, 10 (VI–I, 10; VI–I, 10; VI–I, 10; VI–I, 10; VI–I, 10); anal fin rays I, 9 (I, 9; I, 9; I, 9; I, 9; I, 9); pectoral fin rays 16 (16; 16; 16; 17; 15); pelvic fin rays always I, 5; number of scale rows from upper edge of gill opening to base of caudal fin 27 (28; 27; 27; —; 27); number of scales in front of dorsal fin 8 (8; –; 8; 8; –;); number of scales in the transverse series 8 (8; 8; 8; –; –;). See table 26.

Color, pale with brownish blotches on sides; below eye a wide brownish band somewhat broken by paler areas and not extending below level of rear of maxillary; snout, upper part of head, back, and upper sides with small pigmented area or blotches; along midaxis of body five prominent, larger and darker blotches; middle of under side of lower jaw with pigment, rest of body pale; caudal, anal and dorsal fins with traces of a barred color pattern; opercle with a more or less lengthwise blotch; base of pectoral fin with a pair of lengthwise streaks, the upper longer and more intense and extending on base of pectoral rays; pelvics somewhat silvery.

Gill membranes broadly joined to isthmus, the gill opening not confined to in front of pectoral fin base; cheeks, opercles, breast, nape, and sides of nape scaled; lower jaw a trifle shorter than upper, the mouth with a slight upward angle; maxillary not quite reaching to below front of pupil; caudal rounded; tongue truncate, definitely not bilobed; anterior nostril tubular; basal membrane well developed, the usual lobe present followed by a notch, just before joining the pelvic fin rays; pelvic fins joined along the midventral line, but free from the abdomen, lower jaw with an outer row of somewhat enlarged teeth, ending in one or two strong outwardly hooked canines at midside; inside this row a band of villiform teeth; upper jaw with similar outer row of teeth but weaker, and with a similar band of villiform teeth.

Remarks.—This new species differs from all others referred to the genus *Gnatholepis* in having fewer soft anal and soft dorsal rays, 9 and 10, respectively, instead of 10 or 11 and 11 or 12, as in other species that have a truncate tongue; this new form has a band or dark blotch under the eye instead of a streak.

Named *hololepis* in reference to the occurrence of scales entirely covering the cheeks and opercles.

Table 26.—*Counts made on certain species of* Gnatholepis

Species and locality	Dorsal rays			Anal rays				Pectoral rays			Transverse row of scales		
	VI	I, 10	I, 11	I, 9	I, 10	I, 11	I, 12	15	16	17	8	9	10
knighti:													
Hawaiian Islands	6		6			5	1	1	3		3	1	
Hull Island	1		1		1				1			1	
Apia, Samoa	5		5			5		1	5			4	
hololepis: Canton Island	6	6		6				1	4	1	3		
correletti: Malakula Island	2		2		1	1						1	

Species and locality	Number of scale rows				Scales before dorsal				
	27	28	29	30	7	8	9	10	11
knighti:									
Hawaiian Islands		2	2			3	1		
Hull Island			1						1
Apia, Samoa			3	1			2	3	
hololepis: Canton Island	3	1			1	3			
correletti: Malakula Island		1							1

Genus PANDAKA Herre

Pandaka Herre, Monogr. Philippine Bur. Sci., No. 23, p. 196, 1927. (Type, *Pandaka pusilla* Herre.)

PANDAKA PRUINOSA (Jordan and Seale)

Eviota pruinosa Jordan and Seale, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 391, fig. 82, 1906.

116142, Swains Island, reef, May 3–9, 1939, 2 specimens.

The following specimen I refer with uncertainty to this species:

116141, Tau Island, reef at Siulagi Point, June 27, 1939, 1 specimen, 9.5 mm.

51779 (type of *Eviota pruinosa* Jordan and Seale), Pago Pago, Samoa, Jordan and Kellogg.

The following specimen I refer to this genus, but it is not this species, probably an undescribed one.

118455, Apia, Samoa, Jordan and Kellogg, 1 specimen.

Genus FUSIGOBIUS Whitley

Fusigobius Whitley, Austr. Zool., vol. 6, p. 122, 1930. (Type, *Gobius neophytus* Günther.)

FUSIGOBIUS NEOPHYTUS (Günther)

Gobius neophytus Günther, Journ. Mus. Godeffroy, vol. 6, pt. 11, p. 174, pl. 108, fig. E, 1877.

116126, Canton Island, lagoon, May 23–25, 1939, 2 specimens.

52268, Apia, Samoa, Jordan and Kellogg, 2 specimens.

Genus ZONOGOBIUS Bleeker

Zonogobius Bleeker, Arch. Neerl. Sci. Nat., vol. 9, p. 323, 1874. (Type, *Gobius semifasciatus* Kner.)

ZONOGOBIUS SEMIDOLIATUS (Valenciennes)

Gobius semidoliatus Valenciennes, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 12, p. 67, 1837.

116101, Tutuila Island, Fagasa Bay, rockpools, June 5, 1939, 3 specimens.
116102, Hull Island, channel, July 8–12, 1939, 1 specimen.
116100, Tau Island, reef at Siulagi Point, June 27, 1939, 4 specimens.
116099, Tutuila Island, reef at Alofau, June 3, 1939, 5 specimens.
116103, Rose Island, reef, June 11–14, 1939, 1 specimen.
116140, Swains Island, reef, May 3–9, 1939, 4 specimens.
52233, Pago Pago, Samoa, Jordan and Kellogg, 6 specimens.

Genus RHINOGOBIUS Gill

Rhinogobius Gill, Proc. Acad. Nat. Sci. Philadelphia, 1859, p. 145. (Type, *Rhinogobius similis* Gill.)

RHINOGOBIUS CORALLINUS Jordan and Seale

Rhingobius corallinus Jordan and Seale, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 400, fig. 89, 1906.

51780 (type of *Rhinogobius corallinus* Jordan and Seale) (poor condition), Pago Pago, Samoa, Jordan and Kellogg.

RHINOGOBIUS TONGAREVAE (Fowler)

Glossogobius tongarevae Fowler, B. P. Bishop Mus. Bull. 38, p. 27, fig. 4, 1927. (Paratype U.S.N.M. No. 109391 examined.)

116109, Canton Island, reef of widest shallow channel, May 13, 1939, 2 specimens.

116110, Canton Island, lagoon, May 23–25, 1939, 1 specimen.

Fowler's original description and figure are considerably in error. The dorsal rays are VI–10, not VI–6; anal 8 or 9, not 6; scales 25 to 28, not 23; his figure 4 does not agree with his description. The coloration of his figure agrees with my specimens.

RHINOGOBIUS NEBULOSUS (Forskål)

Gobius nebulosus FORSKÅL, Descriptiones animalium . . . , pp. x, 24, 1775.

52239, Apia, Samoa, Jordan and Kellogg, 1 specimen.

Genus PLEUROGOBIUS Seale

Pleurogobius SEALE, Philippine Journ. Sci., vol. 4, p. 536, 1909. (Type, *Pleurogobius boulengeri* Seale.)

Cingulogobius HERRE, Monogr. Philippine Bur. Sci., No. 23, p. 201, 1927. (Type *Pleurogobius boulengeri* Seale.)

PLEUROGOBIUS NARAHARAE (Snyder)

Amblygobius naraharae SNYDER, Proc. U. S. Nat. Mus., vol. 35, p. 101, 1909; vol. 42, p. 515, pl. 68, fig. 2, 1912.

116139, Canton Island, reef at ocean, April 25–28, 1939, 1 specimen.
16138, Tau Island, reef at Siulagi Point, June 27, 1939, 1 specimen.

Genus DROMBUS Jordan and Seale

Drombus JORDAN and SEALE, Proc. U. S. Nat. Mus., vol. 28, p. 797, 1906. (Type, *Drombus palackyi* Jordan and Seale.)

DROMBUS TUTUILAE Jordan and Seale

Drombus tutuilae JORDAN and SEALE, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 399, fig. 88, 1906.

51770 (type of *Drombus tutuilae* Jordan and Seale), Pago Pago, Samoa, Jordan and Kellogg.

Genus VAIMOSA Jordan and Seale

Vaimosa JORDAN and SEALE, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 395, 1906. (Type, *Vaimosa fontinalis* Jordan and Seale.)

VAIMOSA FONTINALIS Jordan and Seale

Vaimosa fontinalis JORDAN and SEALE, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 395, fig. 85, 1906.

51776 (type and 8 paratypes of *Vaimosa fontinalis* Jordan and Seale), Apia Samoa, Jordan and Kellogg.

Genus WAITEA Jordan and Seale

Waitea JORDAN and SEALE, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 407, fig. 94, 1906. (Type, "*Gobius mystacina*"=*Waitea stomias* H. M. Smith.)

WAITEA STOMIAS H. M. Smith

Waitea mystacina JORDAN and SEALE (not Cuvier and Valenciennes), Bull. U. S. Bur. Fish., vol. 25 (1905), p. 407, fig. 94, 1906.

Waitea stomias H. M. SMITH, Journ. Washington Acad. Sci., vol. 31, p. 411, fig. 1, 1941.

51816 (type of *Waitea stomias* H. M. Smith), Apia, Samoa, Jordan and Kellogg.

Genus MAHIDOLIA H. M. Smith

Mahidolia H. M. Smith, Journ. Siam Soc. Nat. Hist., Suppl., vol. 8, No. 4, p. 255, 1932. (Type, *Mahidolia normani* Smith and Koumans, *in* Smith.)

MAHIDOLIA PAGOENSIS, new species

Figure 20

Holotype.—A specimen (U.S.N.M. No. 116113) 15.7 mm. in standard length, collected by Leonard P. Schultz, June 2, 1939, in a stream at the village of Pago Pago, Tutuila Island, along with two paratypes (U.S.N.M. No. 116114) bearing same data. These types were collected among small stones and debris within 75 feet of the mouth of the creek that flows into Pago Pago Bay.

Description.—(Based on the holotype and two paratypes. All measurements are recorded in hundredths of the standard length, 15.7 (13; 16.6 mm.). Counts and measurements for the holotype are given first, followed by those for the paratypes in parentheses, respectively.) Length of head 33.0 (31.6; 31.2); greatest depth 22.2 (21.5; 21.0); diameter of eye 8.3 (8.5; 8.4); distance from tip of snout to rear edge of maxillaries 21.0 (19.2; 21.0); length of snout 5.7 (5.4; 6.6); postorbital length of head 17.8 (18.4; 16.9); least width of preorbital 1.3 (1.5; 1.2); length of caudal peduncle 24.2 (25.4; 25.8); width of caudal peduncle 10.2 (10.0; 10.8); tip of snout to origin of dorsal fin 38.2 (40.0; 36.8); snout to origin of anal fin 61.0 (60.7; 61.0); snout to anus 56.0 (57.2; 56.6); longest (first and second) spines of dorsal 17.8 (19.2; 19.9); longest (last) ray of soft dorsal 21.0 (25.4; 24.7); longest (last) ray of anal fin 21.0 (25.4; 21.7); longest (middle) ray of caudal fin 28.6 (—; 30.2); longest pectoral fin ray 24.2 (26.2; 24.0); longest pelvic fin ray 24.2 (29.2; 4.1).

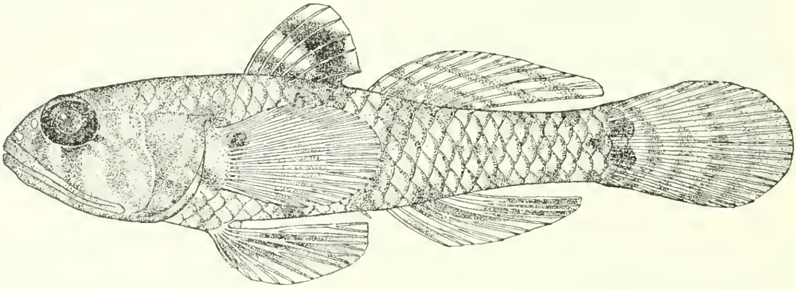

Figure 20.—*Mahidolia pagoensis*, new species: Holotype (U. S. N. M. No. 116113), 15.7 mm. in standard length.

Dorsal fin rays VI–I, 7 (VI–I, 8; VI–I, 7); anal rays I, 6 (I, 6; I, 6); pelvic rays I, 5 (I, 5; I, 5); pectoral rays 16–16 (17–16; 16–16); number of scale rows from gill opening to base of caudal fin 26 (25; 25); number of scales in the transverse row from front of soft dorsal fin to anal fin 7 (7; 7); number of scales in front of dorsal 7 (8; 7).

Color consists of brown markings on a pale background; below eye and across middle of preopercle is a diffuse brownish bar; lower half of opercle brownish; above pectoral base a brown blotch; lower edge of pectoral base with a brownish blotch; margins of scales brownish, their centers pale; two brown saddles somewhat broken on ventral side of abdomen between pelvic base and anal origin, the posterior one passes through anus; four brown spots on ventral margin of body, the first near middle of base of anal fin, the second just behind the anal fin base, the third near middle of length of caudal peduncle and the fourth at the base of the first caudal fin ray; near midline of base of rays of the caudal fin is a V-shaped black blotch, the center is pale with a black blotch dorsally and ventrally and joined anteriorly, the posterior side of the blotch open or pale; tips of first dorsal spine white, then a black spot distally on other spines; caudal barred; pelvics blackish, except that their fifth rays are pale; soft dorsal with two brownish streaks, one basally and the other distally.

Gill membranes broadly joined to the isthmus not restricted to in front of pectoral fin base; cheeks naked, opercles naked; breast scaly; midline of nape and sides of nape scaly, scales ctenoid; tongue rounded; caudal somewhat rounded with the middle rays a little longer, giving the appearance of a pointed caudal in two of the paratypes; jaws equal, the mouth a little oblique; the maxillaries elongate, extending past a vertical through rear of eye to below middle of preopercle; both jaws with some enlarged outer and inner teeth, with a villiform band between them, those on outside confined mostly to front of jaws; basal membrane of pelvics well developed, the disk elongate, and the pelvics are joined their entire length, but not joined to body.

Remarks.—This species differs from the only other member of the genus, *Mahidolia mystacina* Cuvier and Valenciennes (=*Mahidolia normani* Smith and Koumans) by having fewer dorsal rays VI–I, 7 or 8 and anal I, 6 instead of VI–I, 10 and I, 9, respectively; also 25 or 26 scales instead of 40 to 45.

Named *pagoensis* in reference to the creek at the Polynesian village of Pago Pago, Tutuila Island, American Samoa.

Genus OXYURICHTHYS Bleeker

Oxyurichthys Bleeker, Act. Soc. Sci. Ind. Neerl., vol. 8, p. 44, 1860. (Type *Gobius belosso* Bleeker.)

OXYURICHTHYS TENTACULARIS (Valenciennes)

Gobius tentacularis Valenciennes, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 12, p. 128, 1837.

52409, Apia, Samoa, Jordan and Kellogg, 2 specimens.

OXYURICHTHYS PAPUENSIS (Valenciennes)

Gobius papuensis VALENCIENNES, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 12, p. 106, 1837.

116104, Canton Island, lagoon, May 23–25, 1939, 2 specimens.

Genus MARS Jordan and Seale

Mars JORDAN and SEALE, Bull. U. S. Bur. Fish., vol. 25, (1905), p. 408, 1906. (Type, *Mars strigilliceps* Jordan and Seale.)

MARS STRIGILLICEPS Jordan and Seale

Mars strigilliceps JORDAN and SEALE, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 408, fig. 95, 1906.

51778 (type of *Mars strigilliceps* Jordan and Seale), Apia, Samoa, Jordan and Kellogg.

Genus AMBLYGOBIUS Bleeker

Amblygobius BLEEKER, Arch. Neerl. Sci. Nat., vol. 9, p. 322, 1874. (Type, *Gobius sphinx* Valenciennes.)

AMBLYGOBIUS PHALAENA (Valenciennes)

Gobius phalaena VALENCIENNES, *in* Cuvier and Valenciennes, Histoire Naturelle des poissons, vol. 12, p. 92, 1837.

116106, Canton Island, lagoon, May 25–26, 1939, 29 specimens.

116108, Canton Island, lagoon, May 23–25, 1939, 12 specimens.

116107, Canton Island, lagoon, April 23 to May 12, 1939, 3 specimens.

116105, Canton Island, lagoon, May 25–26, 1939, 1 specimen without vertical color bars may be a new form.

51815, Apia, Samoa, Jordan and Kellogg, 4 specimens.

Genus OPLOPOMUS Ehrenberg

Oplopomus (Ehrenberg) CUVIER and VALENCIENNES, Histoire naturelle des poissons, vol. 12, p. 66, 1837. [Type, *Oplopomus pulcher* Ehrenberg (=*Gobius oplopomus* Cuvier and Valenciennes).]

OPLOPOMUS DIACANTHUS, new species

FIGURE 21

Holotype.—The only known specimen (U.S.N.M. No. 116116), 34.3 mm. in standard length, collected by Leonard P. Schultz in the lagoon of Canton Island, May 25–26, 1939.

Description.—(Based on the holotype. All measurements are recorded in hundredths of the standard length.) Length of head 24.8; greatest depth 16.3; diameter of eye 6.7; distance from tip of snout to rear edge of maxillaries 7.6; length of snout 7.6; postorbital length of head 12.0; least width of preorbital 3.8; length of caudal peduncle 22.5; least depth of caudal peduncle 8.5; tip of snout to origin of dorsal fin 33.6; snout to origin of anal fin 53.0; snout to anus 50.5; longest spine (second) of dorsal fin 18.7; longest (fifth or sixth) soft ray of dorsal fin 15.3; longest (ninth) soft ray of anal fin 17.2; longest ray of caudal fin 26.2; longest ray of pectoral fin 22.7; longest ray of pelvic fin 24.8; length of first dorsal spine 15.3; length of spine at front of soft dorsal fin 13.1.

Dorsal fin rays VI–I, 10; anal I, 10; pectoral 18; pelvic I, 5; number of scale rows from gill opening to base of caudal fin 28; scales along midline of back in front of dorssal fin 10; number of scales in the transverse row from front of dorsal to anal fin 8.

Color in alcohol, pale with fine pigment spots along midaxis of body and an additional one basally on caudal fin rays; upper sides with scattered patches of pigment cells; gill membranes white; pectorals white; body with several areas of silvery white, rather large ventrally but small dorsally; below eye an oblique color bar and another across opercle; three tiny patches of pigment in line from front of eye to tip of snout; interorbital with a few pigment cells.

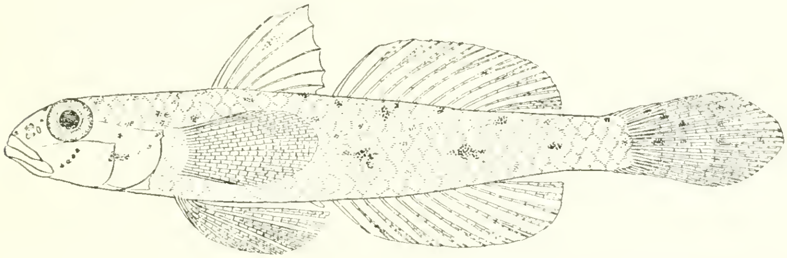

FIGURE 21.—*Oplopomus diacanthus*, new species: Holotype (U. S. N. M. No. 116116), 34.3 mm. in standard length.

Gill membranes broadly joined to isthmus, the gill opening not restricted to in front of the base of pectoral fin; cheeks and opercles naked; midline of back in front of dorsal and sides of nape scaled to eyes; breast scaly; abdomen scaled; base of pectorals scaled; scales ctenoid; mouth somewhat oblique, the maxillaries reaching to below front of eye; tongue truncate; teeth in upper and lower jaws conical and arranged more or less in a villiform band with the outer ones on the lower jaw rather strong and hooked forward; no cutaneous flaps on shoulder girdle; interorbital space very narrow; anterior nostril tubular; basal membrane well developed with the usual lobes then a notch just before it joins the pelvic rays; pelvic fins attached along midline to each other but not joined by membrane to the abdomen; caudal fin rounded; jaws of almost equal length, the lower a trifle longer.

TABLE 27.—*Measurements made on three species of* Oplopomus,[1] *expressed in hundredths of the standard length*

Characters	*oplopomus*	*vergens*	*diacanthus*
Standard length	46.0	56.1	34.3
Length of head	27.4	28.5	24.8
Diameter of eye	8.7	8.7	6.7
Length of maxillaries (mouth)	10.6	10.0	7.6
Greatest depth	22.2	22.8	16.3
Length of snout	8.9	7.5	7.6
Postorbital length of head	13.5	14.1	12.0
Least width of preorbital	4.3	3.7	3.8
Length of caudal peduncle	19.8	21.6	22.5
Least depth of caudal peduncle	11.5	12.3	8.5
Tip of snout to origin dorsal	33.2	34.8	33.6
Tip of snout to origin anal	58.0	58.0	53.0
Tip of snout to anus	51.0	53.5	50.5
Longest ray spiny dorsal	19.5	16.4	18.7
Longest ray soft dorsal	18.5	17.8	15.3
Longest ray anal fin	20.4	16.4	17.2
Longest ray pelvic fin	27.2	22.4	24.8
Longest ray pectoral fin	23.9	21.9	22.7
Longest ray caudal fin	25.0	23.9	26.2
Length first dorsal spine	10.0	10.0	15.3
Length spine soft dorsal	11.3	9.6	13.0

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[1] *O. oplopomus*, U.S.N.M. No. 65971, Caroline Island; *O. vergens*, U.S.N.M. No. 93209, type from Cavite, Philippine Islands; *O. diacanthus*, U.S.N.M. No. 116116, type from Canton Island.

Remarks.—This new species may be recognized by its slender form, as the greatest depth is 16.3 percent and the least depth of the caudal peduncle 8.5 percent of the standard length instead of 22.2 to 22.8 and 11.5 to 12.3 percent, respectively, in *O. oplopomus* and *O. vergens.* In the latter two species the first dorsal spine and the first spine of the soft dorsal are shorter and stouter than in the new species 10.0 and 10 percent and 11.3 and 9.6 percent, respectively, instead of 15.3 and 13.1 percent. The following key also will aid in their separation:

1*a*. Midline of nape scaled as far forward as scales on sides of nape or to eyes.
  2*a*. Cheeks and opercles naked; preopercle without spines; greatest depth about 5.5 .... **O. diacanthus**, new species
  2*b*. Cheeks and opercles fully scaled; preopercle with a pair of flatish spines; depth about 4.5 .... **O. vergens** Jordan and Seale
1*b*. Midline of nape mostly naked, except one or two scales in front of first spine of dorsal fin; scales on sides of nape extend only halfway to eyes; cheeks and opercles naked; preopercle with two flatish spines; depth about 4.5 .... **O. oplopomus** (Valenciennes)

Named *diacanthus* in reference to the two strong spines, one at the front of each dorsal fin.

Genus PERIOPHTHALMUS Bloch

Periophthalmus BLOCH, *in* Schneider, Systema ichthyologiae . . ., p. 63, 1801. (Type, *Periophthalmus papilio* Bloch.)

PERIOPHTHALMUS KOELREUTERI (Pallas)

Gobius koelreuteri PALLAS, Spicilegia zoologica . . ., fasc. 8, p. 8, pl. 2, figs. 1–3, 1770.

52214, Apia, Samoa, Jordan and Kellogg, 12 specimens.
52222, Pago Pago, Samoa, Jordan and Kellogg, 12 specimens
41565, Samoan Islands, Dr. C. H. White, 7 specimens.
76267, Apia, Samoa, Jordan and Kellogg, 1 specimen.

Family ELEOTRIDAE

KEY TO THE SPECIES OF GOBIES WITH SEPARATED PELVIC FINS (THE INNER RAYS NOT JOINED BY A MEMBRANE EVEN AT THEIR BASES) AND WITHOUT A DEVELOPED BASAL MEMBRANE ON PELVICS

1*a*. Pelvic fin rays definitely I, 5.
  2*a*. Margin of preopercle without spines.
    3*a*. Body compressed, dorsal surface of snout and interorbital space scaly; interorbital space as wide as or a little wider than eye or snout; maxillaries not reaching to front of eyes; gill rakers 5+12 or 13; tongue truncate; nape, cheeks, opercles and breast scaled; teeth in a villiform band in both jaws; dorsal rays VI–I, 8 or I, 9; anal I, 10 or I, 11; pectoral about 13; scales 26 to 29; caudal fin a little rounded; black band along midaxis of body ending in a black spot at base of caudal fin a little below midaxis.
      Hypseleotris cyprinoides (Valenciennes)
    3*b*. Body not especially compressed; dorsal surface of snout in front of eyes not scaled; maxillaries reaching to at least front of eyes.
      4*a*. Interorbital space much wider than diameter of eyes; scales small, numbering about 48 to 77 rows from gill opening to base of caudal fin (see table 28 for counts); dorsal rays VI–I, 8; anal I, 8; cheeks, opercles, nape, and breast scaled; no median pore located in the interorbital space; head about 3 in standard length; teeth in villiform bands in both jaws.
        5*a*. Scale rows 49 to 53; 14 or 15 scales in transverse row; about 31 to 36 predorsal scales; pectoral rays 16; pelvic rays not reaching to anus and 1⅔ in head; interorbital space shallowly concave; snout bluntly rounded; maxillaries reaching to under middle of pupils; three blackish lines extending backward and ventrally from eyes; background color brown speckled with black.
          Eleotris melanosoma Bleeker
        5*b*. Scale rows 64 to 66; 17 or 18 in the transverse row; about 44 predorsal scales; pectoral rays 17 or 18; pelvics not reaching to anus 1½ to 1¾ in head; interorbital space shallowly concave; snout bluntly rounded; maxillaries reaching to below middle of pupil; color brown______________________ Eleotris fusca (Bloch)
      4*b*. Interorbital space about as wide as diameter of eyes to much narrower than diameter of eyes and always narrower than length of snout.
        6*a*. Scale rows distinct and fewer than 35.
          7*a*. Gill membranes broadly attached to the isthmus; scale rows about 32; sides of head with prominently raised ridges of pores or papillae; nape, opercles, and breast scaled; cheeks with a few scales dorsally; lower jaw longer, gape of mouth oblique; tongue rounded, a villiform band of teeth in each jaw, the outer ones enlarged; dorsal rays VI–I, 9; anal I, 8; pectoral 17; 12 or 13

scales in the transverse row; color brownish with an irregular band below each dorsal fin and one posteriorly on caudal peduncle________________ **Mucogobius sclateri** (Steindachner)

7b. Gill membranes extending far forward and narrowly attached to the isthmus.

8a. Body not barred; fifth pelvic ray not rudimentary; interorbital deeply concave, with a bony ridge around dorsal rim of orbit; top of head in front of dorsal fin scaled; tongue truncate to bilobed; depth in standard length 4.6; snout in eye 1.55; snout in head 4.0; eye in maxillaries 1.13; eye in head 2.6; dorsal VI–I, 8; anal I, 8; pectoral 17; scales 24; transverse row scales 7; no vertical color bars; margins of scales pigmented with brown; centers of scales pale; three weak bars across upper part of eye.

Trimma caesiura Jordan and Seale

8b. Eight bars on head and body; fifth pelvic ray rudimentary; interorbital space concave with a bony ridge (less developed than in *T. caesiura*) around dorsal rim of orbit; area in front of dorsal fin naked; tongue rounded; depth 4¼; eight blackish bars or saddles, one under eye, next across rear margin of orbits, two in front of dorsal, three under dorsals, and the eighth a saddle on upper edge of caudal peduncle; dorsal rays VI–I, 9 or I, 10; anal I, 8 or I, 9; pectoral about 17; scales 27, 8 in transverse row; cheeks, opercles and nape naked; breast scaly__________ **Trimma eviotops**, new species

6b. Scale rows more numerous than 45, or body appears to be naked at least anteriorly.

9a. Teeth caninelike and strong, arranged in a single row in upper jaw and in two rows anteriorly in lower jaw but one row posteriorly; gill membranes broadly joined to isthmus; midline of back in front of dorsals naked, sides of nape scaled but halfway to eyes; cheeks and opercles naked; breast scaly; tongue rounded; greatest depth 5 to 5½ in standard length and head 3½; scale rows 80 to 87; about 25 in the transverse row; dorsal rays VI–I, 12; anal I, 12; pectoral 18; eye 2 in snout and 2⅔ in maxillaries, the latter rather long, extending to below front of eye; color pale, the tip of the spiny dorsal black; a streak or row of faint spots from lower level of eye and a similar color mark across cheeks; a small median pore between eyes in interorbital space; caudal fin somewhat pointed.

Valenciennea violifera Jordan and Seale

9b. Teeth villiform, in a narrow band on both jaws.

10a. Gill membranes extend far forward and narrowly joined to isthmus with a narrow free fold across it; lower jaw longest, mouth oblique, so that lower jaw enters dorsal profile; edge of shoulder girdle with a cartilaginous projection covered by operculum; depth about 6½; cheeks and opercles naked; breast scaly; sides of, and nape partly scaled, about two-thirds way to eyes in front of dorsal fin; maxillary reaches to under front of eye; dorsal rays VI–I, 12; anal I, 11; pectoral 15 or 16; scale rows 50; about 18 in front of dorsal. (Probably this species belongs in a new genus.)

Heterelectris clara Jordan and Seale

10*b*. Gill membranes moderately attached to isthmus, without free fold; lower jaw not entering profile; no flap on shoulder girdle.

11*a*. Depth about 5; caudal fin somewhat pointed; body naked at present on type although scales may have been present (type in bad state of preservation); no spines on preopercle; dorsal rays VI–I, 11; anal I, 9; pectoral 16; lower jaw a little longer than upper.

Hetereleotris phaenna Jordan and Seale

11*b*. Depth 9.5; caudal fin emarginate, not rounded or pointed; anterior half of body naked, posteriorly covered with small ctenoid scales beginning under origin of second dorsal; tongue rounded; lower jaw longest, mouth very oblique; maxillary not quite reaching to eye; no dermal flap on shoulder girdle; dorsal rays VI–I, 9; anal I, 8; pectoral 17; about 31 scales from under origin of second dorsal to base of caudal fin; base of caudal fin with a blackish rectangular blotch; brown pigment dots arranged in a V-shaped row along each muscle segment.

Fagasa tutuilae, new genus and species

2*b*. Margin of preopercle with 2 to 4 spines; tongue rounded; cheeks, opercle, breast, and nape freely scaled; outer teeth on both jaws canine-like, enlarged with a band of villiform teeth inside the outer row; two pores in midline of interorbital space; body compressed, its greatest width about twice or more in greatest depth; third spine of dorsal elongate; gill membranes broadly attached to isthmus; dorsal rays VI–I, 10 or I, 11; anal I, 8 or I, 9; pectoral 15 to 17; about 26 scale rows, 8 in transverse row; five or six scales in front of spiny dorsal fin; caudal rounded______________________ **Asterropteryx semipunctatus** Rüppell

1*b*. Pelvic fin rays I, 4, fifth ray at most rudimentary.

12*a*. Gill membranes broadly attached to isthmus, not extending far forward; interorbital space much narrower than diameter of eye, with a pore in median line; region in front of dorsal fin naked; cheeks and opercles naked, scales about 22 to 25; dorsal rays VI–I, 8 or 9; anal I, 7 or I, 8.

13a. Least depth about 3.5 times in standard length; no vertical color bars; body, head, and fins dusky; tongue pointed; color dusky without margins of scales brownish, centers of scales pale; fins dusky; dorsal rays VI–I, 8; anal I, 8; pectoral 14; scales 23; scales in transverse row 7; snout in eye 1.2; snout in head 4.1; eye in maxillary 1.09; eye in head 3.4_____ **Eviota herrei** Jordan and Seale

13*b*. Least depth from 4.2 to 5.5 in standard length; color bars present or absent.

14*a*. A pair of intensely black spots located slightly in front of halfway from origin of dorsal fin to rear of orbits; region behind and immediately adjacent to interorbital area brownish; beginning behind pair of black spots 12 or 13 pigment areas along middorsal line; along midventral line from origin of anal to base of caudal fin rays five pigment areas; base of caudal fin rays with more or less diffuse pigment cells; tip of spiny dorsal blackish; least depth 4.6; snout in eye 1.36; snout in head 4.1; eye in maxillary 1.33; eye in head 3.0; dorsal rays VI–I, 9; anal I, 8; pectoral 16; scales 24; scales in transverse row 7.

Eviota smaragdus Jordan and Seale

14*b*. If pigment occurs on upper part of head it is not arranged to form a single pair of darkish spots between eyes and origin of dorsal fin.

15*a*. Midventral line behind anal origin without distinct pigment areas; a black blotch at base of caudal fin rays, more below lengthwise axis than above, and continued as a fan-shaped band in lower half of caudal fin; upper part of head darkish; rest of body pale except a trace of a streak from eye past upper pectoral base, thence below midaxis of body to black caudal spot; depth 5.2 in standard length; snout 1.1 in eye; snout 4.4 in head; eye 1.6 in maxillaries; eye 4 in head; dorsal rays VI–I, 8; anal I, 8; pectoral 16 (there is a rudimentary fifth ray on pelvics of type). **Eviota sebreei Jordan and Seale**

15*b*. Along base of anal fin and midventral line of caudal peduncle five or six pigment areas.

16*a*. Along base of anal fin two pigment areas and three more on midventral line of caudal peduncle (usually these spots are distinct and only somewhat imbedded); caudal peduncle with a black blotch that more or less joins the fifth spot on midventral line of caudal peduncle (a few specimens are almost colorless); spiny dorsal blackish, basal part often white; anal blackish; about 13 to 16 pigment areas sometimes in form of saddles along midline of back, four of these in front of dorsals, nine under dorsals and rest on caudal peduncle; lower pectoral rays of large males fringelike similar to pectorals; depth about 4.5; snout 1.25 to 1.6 in eye; snout 4.4 to 5.0 in head; eye 1.1 to 1.3 in maxillary; eye 3 to 3.1 in head; dorsal rays VI–I, 9; anal I, 7 or I, 8; pectoral 17. **Eviota epiphanes Jenkins**

16*b*. Along base of anal fin three pigment areas and three more on midventral line of caudal peduncle (these spots somewhat imbedded); a pair of postsymphyseal canines each side of symphysis of lower jaw; similar canines on upper jaw; black blotch on caudal peduncle indistinct or absent; two or three faint pigment areas on cheek and another on opercle; dorsals and anal blackish; caudal dusky; young sometimes with two brown spots on pectoral base; tongue pointed; maxillary extends to rear of pupil; first dorsal spines sometimes elongate; depth 4.2 to 5.3; snout in eye 1.2 to 1.4; snout in head 4.1 to 4.6; eye in maxillary 1.0 to 1.5; eye in head 3.1 to 3.6; dorsal rays VI–I, 8 or I, 9; anal I, 7 or 8; pectoral about 16------------------- **Eviota prasites Jordan and Seale**

12*b*. Gill membranes extending far forward and narrowly joined to isthmus; eight blackish bars on head and body; fifth pelvic ray rudimentary; bony interorbital space concave, very narrow; area in front of dorsal fin naked; tongue rounded; depth 4¼; eight blackish bars or saddles, one under eye, next across rear margin of orbit, two in front of dorsals, three under dorsals, and eighth a saddle on upper edge of caudal peduncle; dorsal rays VI–I, 9 or 10; anal I, 8 or I, 9; pectoral 17 or 18; scales 27; 8 in transverse row; head naked; breast naked. **Trimma eviotops**, new species

Genus HYPSELEOTRIS Gill

Hypseleotris Gill, Proc. Acad. Nat. Sci. Philadelphia, vol. 15, p. 270, 1863. (Type, *Eleotris cyprinoides* Cuvier and Valenciennes.)

HYPSELEOTRIS CYPRINOIDES (Valenciennes)

Eleotris cyprinoides Valenciennes, *in* Cuvier and Valenciennes, Histoire Naturelle des poissons, vol. 12, p. 248, 1837.

52219, Apia, Samoa, Jordan and Kellogg, 21 specimens.

52260, Apia, Samoa, Jordan and Kellogg, 1 specimen.

Genus ELEOTRIS Bloch

Eleotris Bloch, *in* Schneider, Systema ichthyologiae . . ., p. 65, 1801. (Type, *Gobius pisonis* Gmelin ref. copied from Jordan's "Genera of Fishes.")

ELEOTRIS MELANOSOMA Bleeker

Eleotris melanosoma Bleeker, Nat. Tijdschr. Ned. Ind., vol. 3, p. 705, 1852.

116167, Tutuila Island, stream at village of Pago Pago, June 2, 1939, 12 specimens.

ELEOTRIS FUSCA (Bloch)

Poecilia fusca Bloch, *in* Schneider, Systema ichthyologiae . . ., p. 453, 1801. (Type locality: "Oriadeae insulae rivulis".)

55217, Apia, Samoa, Jordan and Kellogg, 6 specimens.

Table 28.—*Counts made on specimens of* Eleotris

Species and locality	Scale rows from gill opening to base caudal fin																											
	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
melanosoma:																												
Tutuila Island	1	--	2	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bonin Island	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
fusca:																												
Apia, Samoa	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1	2	--	--	--	--	--	--	--	--	--	--
Tahiti	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1	--	--	--	--	--	--	--	--	--	--	--	--
sandwichensis: Honolulu	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	--	1

Species and locality	Number of scales in transverse row								Number of pectoral rays			
	14	15	16	17	18	19	20	21	16	17	18	19
melanosoma:												
Tutuila Island	2	2	--	--	--	--	--	--	4	--	--	--
Bonin Island	2	--	--	--	--	--	--	--	--	2	--	--
fusca:												
Apia, Samoa	--	--	--	3	1	--	--	--	--	--	4	--
Tahiti	--	--	--	--	2	--	--	--	--	--	1	1
sandwichensis: Honolulu	--	--	--	--	--	--	2	2	--	4	--	--

Genus MUCOGOBIUS McCulloch

Mucogobius McCulloch, Rec. Austr. Mus., vol. 1, p. 93, 1912. (Type, *Gobius mucosus* Günther.)

Metagobius Whitley, Austr. Zool., vol. 6, p. 122, 1930. (Type, *Eleotris sclateri* Steindachner.)

MUCOGOBIUS SCLATERI (Steindachner)

Eleotris sclateri Steindachner, Sitzb. Akad. Wiss. Wien, vol. 80, p. 157, 1879 (1880).

116164, Tutuila Island, reef at Alofau, June 3, 1939, 1 specimen.

51817, Apia, Samoa, Jordan and Kellogg, 7 specimens.

Genus TRIMMA Jordan and Seale

Trimma Jordan and Seale, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 391, 1906. (Type, *Trimma caesiura* Jordan and Seale.)

TRIMMA CAESIURA Jordan and Seale

Trimma caesiura Jordan and Seale, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 391, fig. 83, 1906.

116172, Rose Island, reef, June 11–14, 1939, 1 specimen.

116171, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 2 specimens.

51772 (type of *Trimma caesiura* Jordan and Seale), Apia, Samoa, Jordan and Kellogg.

TRIMMA EVIOTOPS, new species

Figure 22

Holotype.—A specimen (U.S.N.M. No. 116169) 12.2 mm. in standard length collected by Leonard P. Schultz on the reef of Rose Island, June 11–14, 1939 along with five paratypes (U.S.N.M. No. 116170), bearing same data, 12 to 14.1 mm. in standard length.

Description.—(Based on the holotype and five paratypes listed above. The measurements and counts for the holotype are given outside the parentheses and those for the paratypes in the parentheses. All measurements recorded in hundredths of the standard length, 12.2 (14.1; 14.1; 14.1) mm.) Greatest depth 19.7 (17.0; 19.9; 17.7); length of head 29.5 (29.0; 27.8; 29.0); diameter of eye 9.8 (12.0; 10.6; 10.6); tip of snout to posterior corner of maxillary 12.3 (13.4 12.7 12.0); length of snout 4.9 (5.7; 5.7; 5.7;); postorbital length of head 14.7 (14.2; 14.2; 14.2); snout to origin of spiny dorsal 35.2 (39.0; 36.2; 36.2); snout to origin of anal 57.3 (57.4; 57.4; 55.0); length of caudal peduncle or distance from base of last anal ray to base midcaudal fin rays 24.6 (26.9; 24.8; 29.8); least depth of caudal peduncle 12.3 (10.6; 12.0; 11.3); length of longest pelvic fin ray 24.6 (27.0; –; –;); length of caudal fin 23.8 (–; 23.3; 22.6); length of longest pectoral fin ray 21.3 (27.0; –; –;).

Dorsal rays VI–I, 9 (VI–I, 9; VI–I, 10; VI–I, 9; VI–I, 9; VI–I, 9); anal rays I, 9; (I, 8; I, 8; I, 8; I, 9; I, 9; I, 8); pectoral rays 17 (17; 18; 17; –; –;); pelvic fin rays I, 4, with the fifth rays absent or rudmentary. Scales have been mostly lost on all the types but there are about 26 or 27 scale rows from gill opening to base of caudal fin and 8 scales in the transverse row from origin of second dorsal to anal fin base.

The gill membranes extend far forward and are narrowly attached to the isthmus; the caudal fin is rounded; there are two pairs of canines on each side of each jaw, with a band of villiform teeth inside the outer row of canines; the body is compressed, the head not depressed; the mouth is oblique, the lower jaw a little longer; the maxillaries reach to under front of pupil; the interorbital is very narrow, bony, and concave; anal fin origin under that of the second dorsal origin; anus immediately in front of anal fin; pelvic fins not fringed, and reaching to anus or to origin of anal fin; pectorals extending to anal origin; no elongate rays in median fins; no dermal flaps on shoulder girdle; no teeth on vomer or palatines; anterior nostril tubular, posterior nostril not tubular, no pores in midline of interorbital space; head naked, no scales in front of dorsal fin, no scales on breasts.

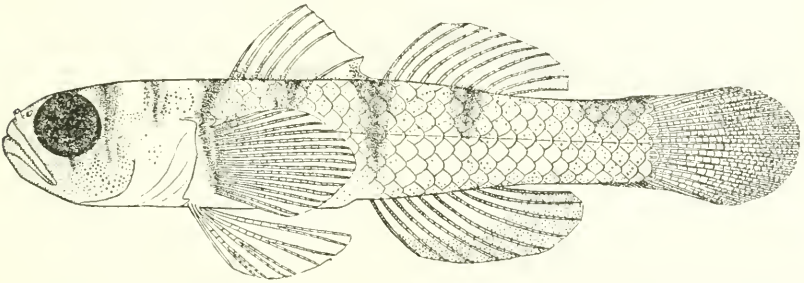


FIGURE 22.—*Trimma eviotops*, new species: Holotype (U.S.N.M. No. 116169), 12.2 mm. in standard length.

Color pale, with eight vertical bars dorsally, the first under middle of eye, very short; the second a saddle from top of head past rear margin of eyes ending at lower margin of cheeks; the third a short saddle midway from eyes to origin of first dorsal ending at upper edge of opercle; fourth at origin of spiny dorsal across pectoral base ending at base of lowest ray; fifth under middle of spiny dorsal; sixth at origin of second dorsal ending at origin of anal; seventh near rear of base of soft dorsal, and eighth a round blotch posteriorly on dorsal part of caudal peduncle.

Remarks.—This eleotrid is intermediate between *Trimma* and *Eviota*, having the pelvic fins of *Eviota* but the gill membranes like *Trimma*. It differs from all other species in the genera *Eviota* and *Trimma* in its color pattern of eight blackish bars or saddles on head and body. The interorbital space and lack of pores there agree with *Trimma* and not *Eviota*.

Named *eviotops* in reference to its similarity to the genus *Eviota*.

Genus VALENCIENNEA Bleeker

Valenciennea BLEEKER, Versl. Akad. Amsterdam, vol. 2, p. 275, 1868. [Type *Valenciennea hasseltii* Bleeker (= *Eleotriodes hasseltii* Bleeker = *Eleotris* *hasseltii* Bleeker, Nat. Tijdschr. Ned. Ind., vol. 1, p. 253, 1861).] Not *Valenciennea* Bleeker, Versl. Akad. Amsterdam, vol. 2, p. 284, 1868 (*Valenciennea strigata* Bleeker). Not *Valenciennesia* Bleeker, Versl. Akad. Amsterdam. vol. 2, p. 288, 1868 (*Valenciennesia strigata* Bleeker = *Eleotriodes strigatus* Bleeker).

Valenciennesia Bleeker, Versl. Akad. Amsterdam, vol. 2, p. 300, 1868. (Type *Valenciennesia hasselti* Bleeker = *Eleotriodes hasseltii* Bleeker.)

VALENCIENNEA VIOLIFERA Jordan and Seale

Valenciennea violifera Jordan and Seale, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 383, pl. 52, fig. 2, 1906.

116166, Tutuila Island, reef at Alofau, June 3, 1939, 1 specimen.

51771 (type and 8 cotypes of *Valenciennea violifera* Jordan and Seale), Apia, Samoa, Jordan and Kellogg.

Genus HETERELEOTRIS Bleeker

Hetereleotris Bleeker, Arch. Néerl. Sci. Nat., vol. 9, p. 306, 1874. (Type, *Gobius diadematus* Rüppell.)

HETERELEOTRIS CLARA Jordan and Seale

Hetereleotris clara Jordan and Seale, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 392, pl. 36, fig. 2, 1906.

116165, Tau Island, reef at Siulagi Point, June 27, 1939, 1 specimen.

51773 (type of *Hetereleotris clara* Jordan and Seale), Pago Pago, Samoa, Jordan and Kellogg.

This species no doubt should be made the type of a new genus.

HETERELEOTRIS PHAENNA Jordan and Seale

Hetereleotris phaenna Jordan and Seale, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 393, pl. 36, fig. 3, 1906.

51786 (type of *H. phaenna*, Jordan and Seale), Pago Pago, Samoa, Jordan, and Kellogg.

FAGASA, new genus

This new genus of goboid fish is characterized by and distinguished from all other genera of gobies by the combination of the following characters: Pelvics I, 5, separated to the base and without basal membrane; gill membranes continued moderately far forward and joined to the isthmus without a free fold across it; body elongate, tubular anteriorly but compressed posteriorly; the depth 9½ times in standard length; anteriorly naked, the scales beginning under origin of second dorsal; mouth nearly vertical, the lower jaw a little longer but not quite entering dorsal profile; interorbital narrow; teeth villiform in narrow bands on both jaws, an outer enlarged series anteriorly.

Genotype.—*Fagasa tutuilae*, new species.

Named *Fagasa* after the Polynesian village and bay where it was caught.

FAGASA TUTUILAE, new species

Figure 23

Holotype.—A specimen (U.S.N.M. No. 116168) 18.5 mm. in standard length, taken by Leonard P. Schultz in a small creek near the village of Fagasa at Fagasa Bay, Tutuila Island, June 5, 1939.

Description.—(Based on the holotype, the only known specimen, listed above. Measurements are in hundredths of the standard length, 18.5 mm.) Greatest depth 10.4; length of head 27.0; diameter of eye 6.6; tip of snout to posterior corner of maxillary 7.1; length of snout 5.5; postorbital length of head 14.3; interorbital space 2.7; snout to origin of spiny dorsal 37.3; snout to origin of anal fin 57.7; length of caudal peduncle, or distance from base of last anal ray to midbase of caudal fin 30.2; least depth of caudal peduncle 6.6; length of longest pelvic fin ray 15.4; length of longest pectoral fin ray 22.0; length outer rays of caudal fin 22.5; length of middle rays of caudal fin 19.8.

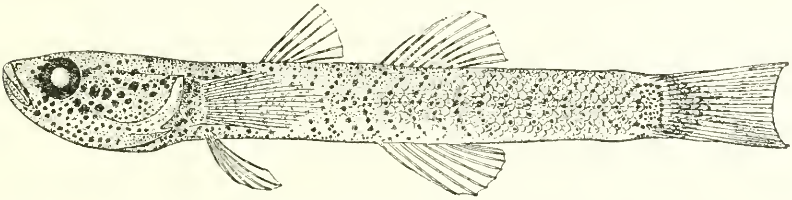


Figure 23.—*Fagasa tutuilae*, new species: Holotype (U.S.N.M. No. 116168), 18.5 mm. in standard length.

Dorsal rays VI–I, 8; anal I, 8; pectoral 17; pelvics I, 5 separated to the base; 31 ctenoid scales from where they begin along midaxis of body under origin of second dorsal to base of the caudal fin.

This elongate eleotrid has the gill membrane free for some distance forward before joining the isthmus; the caudal fin is shallowly emarginate; the teeth are minute or villiform in two or three rows on upper jaw and three or four in lower jaw with the outer series enlarged anteriorly; the head is depressed but the body compressed posteriorly; mouth very oblique, the lower jaw a little longer but not quite entering the dorsal profile; maxillaries not quite reaching to front of eye; anal origin under that of second dorsal origin; anus immediately in front of origin of anal fin; pelvics reaching a little over half but not quite two-thirds the way to the anal origin; pectorals extending a little past tips of pelvics; anterior rays of median fins not elongate; no dermal flaps on shoulder girdle; interorbital space about twice in snout; no teeth on vomer or palatines; anterior nostril tubular posterior at upper margin of eye not tubular; no pore along midline of interorbital space.

Color pale, body covered with brownish specks everywhere, these arranged in a broad V-shape to form a single row along each muscle segment, the apex forward; between these rows finer specks; dorsals barred; caudal fin dusky; a blackish rectangular blotch at base of caudal fin bordered by pale; the brown pigment cells on head more or less arranged in lengthwise rows behind eyes and across cheek; the most distinct row on level of upper edge of pupil.

Remarks.—This new species may be separated from all others by the combination of characters given in the generic diagnosis.

Named *tutuilae* after Tutuila Island, where it was taken.

Genus ASTERROPTERYX Rüppell

Asterropteryx RÜPPELL, Atlas zu der Reise im nördlichen Afrika, Fische, p. 138, 1828. (Type, *Asterropteryx semipunctatus* Rüppell.)

ASTERROPTERYX SEMIPUNCTATUS Rüppell

Asterropteryx semipunctatus RÜPPELL, Atlas zu der Reise im nördlichen Afrika, Fishe, p. 138, pl. 34, fig. 4, 1828.

15115, Samoan Islands, A. B. Steinberger, 2 specimens.
52252, Samoa, Jordan and Kellogg, 9 specimens in very bad condition.
51783, Apia, Samoa, Jordan and Kellogg, 1 specimen.

Genus EVIOTA Jenkins

Eviota JENKINS, Bull. U. S. Bur. Fish., vol. 22 (1902), p. 501, 1903. (Type, *Eviota epiphanes* Jenkins.)

Allogobius WAITE, Rec. Austr. Mus., vol. 5, p. 176, 1904. (Type, *Allogobius viridis* Waite.)

EVIOTA HERREI Jordan and Seale

Eviota herrei JORDAN and SEALE, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 390, fig. 81, 1906.

51769 (type and 2 cotypes of *Eviota herrei* Jordan and Seale), Apia, Samoa, Jordan and Kellogg.

EVIOTA SMARAGDUS Jordan and Seale

Eviota smaragdus JORDAN and SEALE, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 388, fig. 78, 1906.

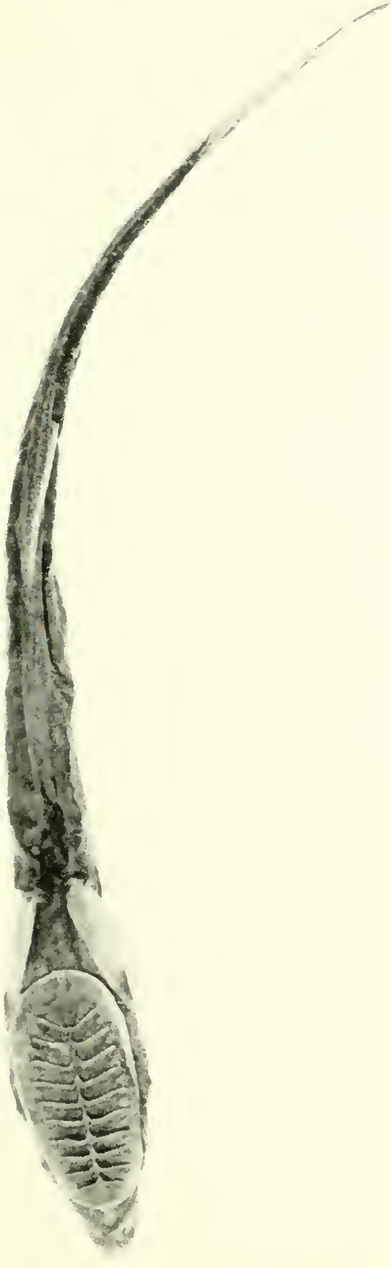
116148, Tau Island, reef at Siulagi Point, June 27, 1939, 17 specimens.
116146, Tutuila Island, Fagasa Bay, rock pools, June 5, 1939, 7 specimens.
116147, Tutuila Island, reef at Alofau, June 3, 1939, 1 specimen.

51764 (type and 6 cotypes of *Eviota smaragdus* Jordan and Seale), Pago Pago, Samoa, Jordan and Kellogg.

EVIOTA SEBREEI Jordan and Seale

Eviota sebreei JORDAN and SEALE, Bull. U. S. Bur. Fish., vol. 25 (1905) p. 390, fig. 80, 1906.

51765 (type of *Eviota sebreei* Jordan and Seale), Apia, Samoa, Jordan and Kellogg.



Phtheirichthys multiradiatus, new species: Holotype (U.S.N.M. No. 115736), 58 mm. in standard length. Photograph.

EVIOTA EPIPHANES Jenkins

Eviota epiphanes JENKINS, Bull. U. S. Bur. Fish., vol. 22 (1902), p. 501, fig. 42, 1903.

Allogobius viridis WAITE, Rec. Austr. Mus., vol. 5, p. 177, pl. 23, fig. 3, 1904.

Eviota zonura JORDAN and SEALE, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 386, fig. 75, 1906.

Eviota gymnocephalus WEBER, *Siboga*-Expedition, vol. 57, p. 452, fig. 87, 1913.

116160, Tutuila Island, Fagasa Bay, rock pools, June 5, 1939, 1 specimen.

116156, Hull Island, reef, July 12–15, 1939, 108 specimens.

116152, Tau Island, reef at Siulagi Pt., June 27, 1939, 36 specimens.

116158, Rose Island, reef, June 11–14, 1939, 7 specimens.

116159, Canton Island, reef of widest shallow channel, May 13, 1939, 1 specimen.

116161, Canton Island, reef at ocean, April 25–28, 1939, 13 specimens.

116149, Hull Island, channel, July 7–17, 1939, 8 specimens.

116151, Tutuila Island, reef at Alofau, June 3, 1939, 1 specimen.

116150, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 1 specimen.

116163, Swains Island, reef, May 3–9, 1939, 5 specimens.

116155, Hull Island, channel, July 8–12, 1939, 12 specimens.

116157, Hull Island, shallow tidepool, July 13, 1939, 10 specimens.

116153, Rose Island, lagoon, June 12–20, 1939, 2 specimens.

The next two collections I refer to *E. epiphanes* with considerable doubt, as there are but four pigment areas behind the anal origin along the midventral line and 13 saddles or spots along the middorsal line. Probably these specimens represent a new species, but all are 8.5 mm. or shorter.

116162, Hull Island, reef, July 12–15, 1939, 13 specimens.

116154, Rose Island, reef, June 11–14, 1939, 2 specimens.

51766 (type and 18 cotypes of *Eviota zonura* Jordan and Seale), Pago Pago, Samoa, Jordan and Kellogg.

50720, type of *E. epiphanes* examined.

EVIOTA PRASITES Jordan and Seale

Eviota prasites JORDAN and SEALE, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 387, fig. 76, 1906.

Eviota afelei JORDAN and SEALE, *ibid.*, p. 387, fig. 388.

Eviota distigma JORDAN and SEALE, *ibid.*, p. 389, fig. 79.

? Eviota sealei HERRE, Monogr. Philippine Bur. Sci., No. 23, p. 73, 1927.

116143, Canton Island, lagoon, April 23 to May 12, 1939, 1 specimen.

116144, Canton Island, lagoon, May 23 to May 25, 1939, 2 specimens.

116145, Tau Island, reef at Siulagi Point, June 27, 1939, 1 specimen.

51768 (type of *Eviota prasites* Jordan and Seale), Pago Pago, Samoa, Jordan and Kellogg.

51763 (type and 2 cotypes of *Eviota afelei* Jordan and Seale), Pago Pago, Samoa, Jordan and Kellogg.

51767 (type and 4 cotypes of *Eviota distigma* Jordan and Seale), Pago, Pago, Samoa, Jordan and Kellogg.

Order DISCOCEPHALI

Family ECHENEIDAE

KEY TO THE GENERA OF ECHENEIDS FROM THE PHOENIX AND SAMOAN ISLANDS

1*a*. Body and tail slender; pelvic fins with their inner rays partially connected by a membrane that is mostly free from belly; pectorals pointed; lower jaw considerably longer than upper jaw.
  2*a*. Laminae in disk IX to XI, almost always X---------- **Phtheirichthys Gill**
  2*b*. Laminae in disk XXI to XXIX---------------------- **Echeneis Linnaeus**
1*b*. Body and tail robust; pelvic fins with inner rays mostly attached to belly; pectorals rounded; lower jaw only a trifle longer, or equal to upper jaw; laminae in disk XII to XIX--------------------------- **Remora Forster**

Genus PHTHEIRICHTHYS Gill

Phtheirichthys Gill, Proc. Acad. Nat. Sci. Philadelphia, 1862, p. 239. (Type, *Echeneis lineata* Menzies.)

KEY TO THE SPECIES OF PHTHEIRICHTHYS

1*a*. Dorsal rays 36 to 38; anal 37 or 38
Phtheirichthys multiradiatus, new species
1*b*. Dorsal rays 31 to 33; anal 30 to 33---- **Phtheirichthys lineatus (Menzies)**

PHTHEIRICHTHYS MULTIRADIATUS, new species

PLATE 9

Holotype.—A specimen (U.S.N.M. No. 115736) 58 mm. in standard length, taken off a barracuda, *Sphyraena snodgrassi*, that was caught off the reef of Canton Island, April 25, 1939, by Capt. J. N. Lewis.

In addition, there is one paratype probably taken by the Wilkes Exploring Expedition, for this specimen was in a jar with another echeneid, *Phtheirichthys lineatus*, bearing the original number 600, and the quality of paper and size of tag was similar to that used by the Wilkes Exploring Expedition; our catalog gives Pacific Ocean, and the catalog number is 117864.

Description.—(Based on the holotype and the paratype, only known specimens. Detailed counts and measurements of the holotype are given first, followed by those for the paratype in parentheses. Standard length 58 mm. (113) and total length 68.4 mm. (135.7). All measurements are expressed in hundredths of the standard length.) Length of head 20.2 (19.7); greatest depth of body 7.8 (8.8); length of snout 8.5 (8.8); diameter of eye 5.2 (4.9); distance from tip of snout to posterior edge of maxillary 7.2 (7.4); distance from tip of snout to origin of dorsal 54.2 (55.6); snout to origin of anal fin 53 (53.7); snout to insertion of pelvic fins 21.6

(20.8); distance from posterior base of anal fin to midbase of caudal fin 7.8 (8.2); least depth of caudal peduncle 2.9 (3.1); length of longest ray of pectoral fin 12.1 (12.4); length of longest ray of pelvic fin 11.8 (13.3); length of longest (middle) ray of caudal fin 15.7 (18.9); postorbital length of head 7.9 (8.0); interorbital space 9.0 (10.1); distance from posterior edge of disk to origin of soft dorsal fin 30.7 (30.5); length of disk 20.4 (23.4); greatest width of disk 10.4 (12.0); distance from tip of lower jaw to front of eye 10.4 (9.7); tip of lower jaw to rear edge of the maxilliary 9.3 (8.6); the following counts were made respectively. Number of laminae in disk 10 (10); dorsal rays 38 (36); anal rays 38 (37); pectoral 20 (20); gill rakers on first gill arch 1+1+16 (1+1+15).

The teeth at front of upper jaw consist of a few short canines hooked inward, and along the outer sides of jaw is a row of small, sharp, conical teeth curved outward inside of which is an inner row, these two rows becoming one row posteriorly; the strongly projecting lower jaw has several canines on its projecting tip with two or three irregular rows of small, sharp teeth posteriorly; there are similar sharp teeth on the vomer, palatines, and tongue.

Color not well preserved in the types, but probably the same as in *P. lineatus;* the dorsal and anal margins of caudal fin are pale with the midaxis black; body blackish; pectoral fins pale; pelvic fins blackish, their outer margin pale; a pair of white lines along sides of body on paratype but absent on holotype.

Remarks.—This new species from the Pacific Ocean differs from *P. lineatus* (Menzies) chiefly in having 36 to 38 dorsal, 37 or 38 anal rays in contrast to 31 to 34 dorsal, 31 to 34 anal rays, and 15 or 16 gill rakers on the lower limb of the gill arch instead of 13 or 14. In the Atlantic Ocean my counts are: Dorsal 30 to 33; anal 29 to 33, with two specimens having 35 and 36 dorsal and both have 35 anal rays. Certain measurements were made on five specimens of *P. lineatus*, and for comparison these along with similar ones for the new species are presented in table 29. It will be noted that two specimens from the Atlantic and the two from the Pacific have more rays in the dorsal and anal fins than is to be expected in the frequency (table 30). The lack of material makes it impossible to determine the variability in the number of fin rays but these data indicate two forms in each ocean, those in the Pacific having a ray or two more in each fin than those in the Atlantic. In view of these facts it seemed best to name the form with the more numerous fin rays.

TABLE 29.—*Counts and measurements of the two species of* Phtheirichthys[1]

Character	*P. multiradiatus*		*P. lineatus*				
	Off reef of Canton Island	Pacific Ocean	Pacific Ocean	Woods Hole, Mass.	Latitude 75°47′ N., longitude 9°5′ W.	Near Isle of Wight, England	
	U.S.N.M. No. 115736	U.S.N.M. No. 117864	U.S.N.M. No. 7031	U.S.N.M. No. 20331	U.S.N.M. No. 92305	U.S.N.M. No. 86582	U.S.N.M. No. 86582
Standard length	58.0	113	140.5	134	53	60.3	60.0
Total length	68.4	135.7	167	162	68	---	---
Head	20.2	19.7	17.8	18.4	20.9	---	---
Snout	8.5	8.8	7.7	7.7	9.4	---	---
Eye	5.2	4.9	5.3	4.6	5.6	---	---
Postorbital length of head	7.9	8.0	6.8	7.5	8.3	---	---
Depth of body	7.8	8.8	8.9	9.1	8.3	---	---
Least depth of caudal peduncle	2.9	3.1	3.0	3.6	3.2	---	---
Length of caudal peduncle	7.8	8.2	9.5	8.6	7.9	---	---
Snout to soft dorsal	54.2	55.6	56.2	54.2	57.4	---	---
Snout to anal	53.0	53.7	54.6	52.7	54.6	---	---
Snout to pelvic base	21.6	20.8	19.6	18.5	21.2	---	---
Interorbital space	9.0	10.1	10.3	10.1	10.0	---	---
Rear of disk to dorsal	30.7	30.5	34.5	35.2	33.0	---	---
Length of disk	20.4	23.4	21.0	20.4	22.6	---	---
Greatest width of disk	10.4	12.0	11.0	10.5	11.3	---	---
Eye to tip of lower jaw	10.4	9.7	9.2	9.2	10.6	---	---
Length of upper jaw	7.2	7.4	6.4	6.2	7.7	---	---
Length of lower jaw	9.3	8.6	7.3	7.2	9.6	---	---
Length of longest caudal ray	15.7	18.9	16.4	19.4	26.0	---	---
Length of longest pectoral ray	12.1	12.4	11.9	11.8	13.6	---	---
Length of longest pelvic ray	11.8	13.3	12.0	12.2	13.4	---	---
Dorsal rays	38	36	31	31	31	33	35
Anal rays	38	37	31	30	32	33	35
Pectoral rays	20	20	19	19	18	19	20
Gill rakers	1+1+16	1+1+15	3+1+13	3+1+14	?+1+13	2 or 3+1 +13	2 or 3+1 +13
Laminae in disk	10	10	10	10	9	10	10

[1] All measurements are expressed in hundredths of the standard length.

TABLE 30.—*Counts made on* Phtheirichthys[1]

Species and locality	Number of laminae in disk			Number of fin rays																		
				Dorsal									Anal									
	9	10	11	30	31	32	33	34	35	36	37	38	29	30	31	32	33	34	35	36	37	38
P. lineatus:																						
Pacific Ocean	---	6	---	---	1	2	2	1	---	---	---	---	---	---	2	2	1	1	---	---	---	---
Atlantic Ocean	1	5	1	2	3	---	2	---	---	---	---	---	1	1	1	2	2	---	---	---	---	---
P. multiradiatus:																						
Pacific Ocean	---	2	---	---	---	---	---	---	---	1	---	1	---	---	---	---	---	---	---	---	1	1
Atlantic Ocean	---	1	1	---	---	---	---	---	1	1	---	---	---	---	---	---	---	---	2	---	---	---

[1] Counts were made on two specimens in the collection of the Academy of Natural Sciences of Philadelphia and eight from the Museum of Comparative Zoology through the courtesy of H. W. Fowler and W. C. Schroeder, respectively. The specimens are from the following localities, respectively: Atlantic, north of Tropics; Pacific Ocean; Singapore; Cuba; Habana, Cuba; Habana, Cuba; Atlantic Ocean; Tahiti; Hong Kong; and Hong Kong. Other specimens in the National Museum.

PHTHEIRICHTHYS LINEATUS (Menzies)

Echeneis lineata Menzies, Trans. Linn. Soc. London, vol. 1, p. 187, pl. 17, fig. 1, 1791 (type locality: Tropical Pacific Ocean).—Bloch and Schneider, Systema ichthyologiae . . ., p. 240, pl. 53, upper figure, 1801 (short description).—Lacepède, Histoire naturelle des poissons, vol. 3, pp. 146, 167, 1802 (short description).—Shaw, General zoology, vol. 4, p. 211, 1803 (ref. copied).—Günther, Ann. Mag. Nat. Hist., May 1860, p. 398 (ref. copied); Catalogue of the fishes of the British Museum, vol. 2, p. 8, 1860 (short description).—Schmeltz, Mus. Godeffroy, Cat. 1, p. 9, 1864 (South Seas) (ref. copied).—Lütken, Ichthyographiske bidrag, V, Museets Sugefiske (Echeneidae), Vid. Medd. Nat. Foren. Kjøbenhavn, 1875, pp. 2, 11, 1876 (6 specimens from Atlantic).—Günther, Fische der Südsee, vol. 11, pt. 5, p. 156, pl. 47, 1876 (2 specimens in British Museum).—Delsman and Hardenberg, VI, De Indische Zeevischen en Zeevisscherij, p. 345, fig. 250, 1934 (3 specimens, 21, 32, 50 mm., showing development of disk).—Franz, Abh. Bayer. Akad. Wiss., math.-phys. Klasse, vol. 4, Suppl., vol. 1, Abhdlg., p. 70, 1910 (Misaki, Sagami, 15 cm. long) (ref. copied).

Phtheirichthys lineatus Jordan and Evermann, U. S. Nat. Mus., Bull. 49, pt. 3, p. 2268, 1898 (short description, no record given).—Tanaka, Figures and descriptions of the fishes of Japan, p. 259, pls. 72, figs. 252–254, 1913; *ibid.*, 1935 (1 specimen, Misaki, Sagami, Japan).—Gudger, Amer. Mus. Nov., No. 234, p. 10, figs. 3, 4, 1926 (partial history of capture).—Vanderbilt, To Galapagos on the *Ara*, pp. 14, 145, 146, pl. 24, 1927 (taken from a barracuda caught off Hogsty Island, Bahamas, Feb. 13, 1926) (ref. copied.)—Barnard, Ann. South African Mus., vol. 21, pt. 2, p. 419, 1927 (Table Bay—2 specimens in the South African Museum).—Fowler, Mem. Bishop Mus., vol. 10, p. 421, 1928 (one specimen, lat. 6° N., long. 162° W.); *ibid.*, Suppl. I, p. 363, 1931.—Gudger, Journ. Amer. Mus. Nat. Hist., vol. 28, p. 35, pl., and figs. 1, 2, 1928 (popular history of capture of specimens.)—Meek and Hildebrand, Marine fishes of Panama, pt. 3, p. 895, 1928 (no record).—Fowler, Bull. Amer. Mus. Nat. Hist., vol. 70, pt. 2, p. 1020, 1936 (Atlantic north of the Tropics; Pacific Ocean).

Echeneis tropica Euphrasen, Handl. Vet. Akad., vol. 12, pp. 315, 317, 1791 (type locality: "Habitat in Oceano occidentali intra Tropicos"; the specimen was taken in "2°9′ N. lat. and 20°49′ W. long. from Paris," which places the locality about 600 miles off Liberia, Africa).

Echeneis apicalis Poey, Mem. Hist. Nat. Cuba, vol. 2, p. 254, 1861 (type locality: Cuba).

Echeneis sphyraenarum Poey, *ibid.*, p. 255 (type locality: Cuba).

Phtheirichthys tropicus Jordan, Evermann, and Clark, Rept. U. S. Comm. Fish., 1928, pt. 2, p. 449, 1930 (no locality record).

Phtheirichthys lineatus (Menzies) Jordan and Gilbert, U. S. Nat. Mus. Bull. 16, p. 969, 1882 (short description, no locality record).

No attempt has been made to list all references to *Phtheirichthys lineatus*, only some of the more important ones.

Genus ECHENEIS Linnaeus

Echeneis Linnaeus, after Artedi, Systema naturae, ed. 10, p. 260, 1758. (Type *Echeneis naucrates* Linnaeus.)

ECHENEIS NAUCRATES Linnaeus

Echeneis naucrates LINNAEUS, Systema naturae, ed. 10, p. 261, 1758 (type locality: Pelago Indico).

89810, Samoan Islands, Capt. J. P. Ault, 1 specimen; on this specimen there are 24 laminae in the disk, 41 dorsal rays, and 33 anal rays.

Genus REMORA Forster

Remora FORSTER, A catalogue of the animals of North America, p. 20, 1771 (type, *Echeneis remora* Linnaeus).—CATESBY, *in* Catesby and Edwards, The natural history of Carolina, Florida and the Bahama Islands 1731–1750, p. 26, 1771 (type, *E. remora* Linnaeus).—GILL, Proc. Acad. Nat. Sci. Philadelphia, 1862, p. 239 (type, *E. remora* Linnaeus, as restricted by Gill, the first reviser).

REMORA REMORA (Linnaeus)

Echeneis remora LINNAEUS, Systema naturae, ed. 10, p. 260, 1758.

115737, McKean Island, from a shark taken off the reef, April 30, 1939, 2 specimens. In both specimens there are 18 laminae in the disk; 25 dorsal and 23 anal rays; gill rakers 3+1+28, and 4+1+27; 28 pectoral rays.

83013, Hulls Island, Wilkes Exploring Expedition, 1 specimen.

Order JUGULARES

Family TRICHONOTIDAE

The reference of genera to this family or relationship by various authors from time to time has frequently been the result of inadequate material for comparison of anatomical characters. The genera centering around *Kraemeria* have features that resemble the trichonotids more than the gobiids, and this has influenced me to place them in a subfamily. However, *Paragobioides* Kendall and Goldsborough has been referred to this group by Fowler, but it certainly does not resemble any of the trichonotids except by its elongated body and numerous fin rays. A series of pores over the eye, no lateral line, and the restricted gill opening cause me to conclude that *Paragobioides* is nearer the Gobiidae than the Trichonotidae. Its true relationship will be determined no doubt from a study of its skeleton, and until that is done I propose to consider it tentatively as a distinct subfamily. I am inclined to believe that Hora,[25] in referring *Paragobioides* to the subfamily Taenioidinae under the Gobiidae, is close to the true relationship.

In order to separate the various genera referred to the family at various times (from a practical viewpoint) and to indicate some of the relationships with my Samoan and Phoenix Island material, I have prepared a key and incorporated the various genera as noticed by me in the literature.

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[25] Rec. Indian Mus., vol. 27, pt. 6, p. 455, 1925.

KEY TO THE FAMILY TRICHONOTIDAE

1*a*. Lateral line present, below midaxis at least posteriorly; lower jaw shortest, snout projecting in front of thin and weak lower jaw; tip of tongue free, narrow and pointed, not bilobed; gill membranes extending far forward, free from isthmus________________________________(LIMNICHTHYINAE)

2*a*. Lateral line along midaxis anteriorly, below it posteriorly, and meeting or nearly meeting its fellow behind anal fin; snout much projecting in front of lower jaw; tip of snout fleshy, protractile lips of lower jaw with cirri on sides.

3*a*. Sides of body fully scaled; pelvic rays I, 5, dorsal fin rays fewer than 30; fewer than 45 scales in lateral line.

4*a*. Dorsal fin rays about 25 or 26; anal 27 to 29; pectoral 13, lower rays not separated and different from upper rays; scales in lateral line about 40________________________________ **Limnichthys**[26] Waite

4*b*. Dorsal rays 19; anal 29; pectoral 8+9=17, lower rays longer than and somewhat separated from upper rays; scales in lateral line 37 **Schizochirus**[27] Waite

2*b*. Lateral line below midaxis anteriorly abruptly decurved behind pectoral fin, then continuing about halfway from midaxis to base of anal fin along lower side but not meeting its fellow behind anal fin; snout a little longer than lower jaw and somewhat fleshy; dorsal origin behind that of anal, over third to fourth anal ray; dorsal rays 35; anal 42; pectoral 15; pelvics I, 5____________________________ **Tewara**[28] Griffin

3*b*. Sides of body not fully scaled, naked at least above and below lateral line anteriorly; dorsal fin rays more than 30; about 53 to 60 pores and scales in lateral line.

5*a*. Pelvic rays I, 4; a row of isolated scales in front of dorsal fin along middorsal line; a row of scales along base of dorsal fin and along base of anal fin posteriorly; region of caudal peduncle with scales; dorsal rays 34 to 37; anal 35 to 38; pores in lateral line 54 to 57 **Chalixodytes tauensis**, new genus and species

5*b*. Pelvic rays I, 5; only scales present occur along lateral line.

6*a*. Dorsal rays 40 to 43; anal 37 to 39; pores in lateral line 56 to 60________ **Crystallodytes cookei enderburyensis**, new subspecies

6*b*. Dorsal rays 37 or 38; anal 35 to 37; pores in lateral line 54 **Crystallodytes cookei cookei**[29] Fowler

1*b*. Lateral line present or absent; if present its course is along midaxis and not below it; snout either shorter than lower jaw (the latter strongly projecting) or lower and upper jaws about same length.

7*a*. Body naked; gill membranes narrowly attached to isthmus free for some distance forward; tongue bilobed; dorsal rays about 19 or 20, about first five simple; anal about 13 to 15, first ray probably simple;

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[26] *Limnichthys* Waite, Rec. Austr. Mus., vol. 5, pt. 3, p. 178, 1904 (genotype, *Limnichthys fasciatus* Waite, *ibid.*, pp. 178–179, pl. 23, fig. 4, 1904, monotypic).—McCulloch, Austr. Zool., vol. 2, pt. 3, p. 102, fig. 276a, 1922.

[27] *Schizochirus* Waite, Rec. Austr. Mus., vol. 5, pt. 4, p. 240, 1904 (genotype, *Schizochirus insolens* Waite, *ibid.*, pp. 242–243, figs. 33, 34, pl. 26, fig. 3, 1904, monotypic).—McCulloch, Austr. Zool., vol. 2, pt. 3, p. 102, fig. 277a, 1922.

[28] *Tewara* Griffin, Trans. Proc. New Zealand Inst., vol. 63, pt. 2, p. 174–176, pl. 25, upper fig., 1933 (genotype, *Tewara cranwelli* Griffin).

[29] *Crystallodytes cookei* Fowler, Occ. Papers B. P. Bishop Mus., vol. 8, p. 390–392, 1923 (type locality: Laie Beach, Oahu); Mem. B. P. Bishop Mus., vol. 10, p. 426, fig. 60, 1928.—Pietschmann, B. P. Bishop Mus. Bull. 156, p. 44, pl. 16B, 1938.

pelvics I, 5; the inner rays longest; about 9 or 10 branched rays in caudal fin____ (KRAEMERINAE)[30]

8*a*. Pectoral rays 3 or 4; dorsal rays 19 or 20; anal 13 or 14.
Kraemeria bryani Schultz[31]

8*b*. Pectoral rays 7 or 8; dorsal rays 19 or 20; anal 14 or 15.
Kraemeria samoensis Steindachner

7*b*. Body fully scaled, although scales may be minute on *Paragobioides*, in which case dorsal rays number about 60; tongue not bilobed but rounded or pointed.

9*a*. Gill membranes not widely joined to the isthmus but free forward, gill opening not restricted to sides______________ (TRICHONOTINAE)

10*a*. First one or two anterior rays of dorsal long and filamentous; inner rays of pelvics long and filamentous.
Trichonotus[32] Bloch; **Taeniolabrus**[32] Steindachner

10*b*. First rays of dorsal and last rays of pelvics not elongate or filamentous____________ **Hemerocoetes**[33] Cuvier and Valenciennes;
Creedia[33] Ogilby; **Lesueurina**[33] Fowler; **Squamicreedia**[33] Rendahl

9*b*. Gill membranes broadly joined to the isthmus, the gill opening mostly restricted to the sides; dorsal rays 60; anal 37; pectoral 14 or 15; pelvics ? I, 4; scales minute not visible on young; no lateral line; anus under the 25th dorsal ray; 11 branched rays in caudal fin (15 jointed rays) (PARAGOBIOIDINAE).
Paragobioides[34] Kendall and Goldsborough

CHALIXODYTES, new genus

This new genus is recognized from other closely related genera in the key on page 261, by having I, 4 pelvic rays, a lateral line that extends ventrally and meets or nearly meets its fellow behind the anal fin, in combination with a row of scales along the middorsal line in front of the dorsal fin, and a row of scales posteriorly along the bases of the dorsal and the anal fins; also a few scales posteriorly on the caudal region of the body; tongue long and pointed not bilobed; other characters are those of the species.

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[30] *Kraemeria* Steindachner, Sitzb. Akad. Wiss. Wien, vol. 115, pt. 1, p. 41, July 1906 (type, *Kraemeria samoensis* Steindachner).

Vitreola Jordan and Seale, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 393, Dec. 1906 (type, *Vitreola sagitta* Jordan and Seale, *ibid*, pl. 37, fig. 1).

Psammichthys Regan, Trans. Linn. Soc. London, ser. 2, Zool., vol. 12, pt. 3, p. 246, 1908 (type, *Psammichthys nudus* Regan, *ibid.*, pl. 31, fig. 1).—*Psammichthyidae* Regan, Ann. Mag. Nat. Hist., ser. 8, vol. 8, p. 733, 1911.

[31] Journ. Washington Acad. Sci., vol. 31, p. 271, 1941.

[32] *Trichonotus* Bloch, in Schneider, Systema ichthyologiae, p. 179, 1801 (genotype, *Trichonotus setiger* Bloch).

Taeniolabrus Steindachner, Sitzb. Akad. Wiss. Wien, vol. 55, p. 713, 1867 (type, *Taeniolabrus filamentosus* Steindachner).

Taeniolabrus marleyi Smith, Trans. Roy. Soc. South Africa, vol. 24, pt. 1, pp. 4–6, pls. 1, 2, 1936 (type locality: Durban).

[33] *Hemerocoetes* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 12, p. 311, 1837 (type, *Callionymus acanthorhynchus* Forster).

Creedia Ogilby, Proc. Linn. Soc. New South Wales, vol. 23, pt. 3, p. 298, 1898 (type, *Creedia clathrisquamis* Ogilby); McCulloch, Australian Zool., vol. 2, pt. 3, p. 101, pl. 31, fig. 275a, of *Creedia clathrisquamis* Ogilby, 1922.

Hemerocoetes haswelli Ramsay, Proc. Linn. Soc. New South Wales, vol. 6, p. 575, 1881 (type locality: North Head of Port Jackson).

Lesueurina Fowler, Proc. Acad. Nat. Sci. Philadelphia, 1907, p. 440 [type, *Lesueurina platycephala* Fowler (*Lesueurella platycephalus* Fowler, misprint)].

Squamicreedia Rendahl, Svenska Vet. Handl., vol. 61, No. 9, p. 20, 1921 (type, *Squamicreedia obtusa* Rendahl).

[34] *Paragobioides* Kendall and Goldsborough, Mem. Mus. Comp. Zool., vol. 26, p. 324, pl. 6, fig. 2, 1911 (type, *Paragobioides grandoculis* Kendall and Goldsborough).—Fowler, Acad. Nat. Sci. Philadelphia Monogr. No. 2, pp. 206–207, 1938.

Genotype.—Chalixodytes tauensis, new species.

Named *Chalixodytes* in reference to its habits of diving and burrowing into the fine coral gravel from where it was captured.

CHALIXODYTES TAUENSIS, new species

FIGURE 24

Holotype.—A specimen (U.S.N.M. No. 116083) 31.2 mm. in standard length, taken by Leonard P. Schultz from the reef of Tau Island at Siulagi Point, June 27, 1939, along with 32 paratypes (U.S.N.M. No. 116084) bearing same data. In addition, one paratype (U.S.N.M. No. 116085) was collected by L. P. Schultz and Frank Taiga from the reef at Pagai, Tutuila Island, June 4, 1939. These paratypes measure from 15.6 to 36.6 mm. in standard length.

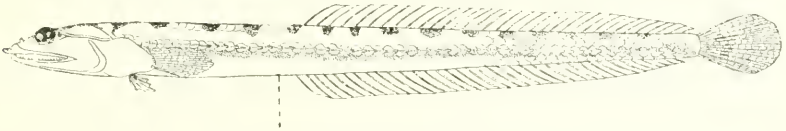

FIGURE 24.—*Chalixodytes tauensis*, new species: Holotype (U. S. N. M. No. 116083), 31.2 mm. in standard length.

Description.—(Based on the holotype and 33 paratypes. All measurements are expressed in hundredths of the standard length, 31.2 (33.1; 32.6 mm.), those for the holotype outside the parentheses and for 2 paratypes within parentheses.) Length of head 21.8 (22.0; 22.0); greatest depth 6.4 7.5; 7.8); diameter of eye 3.0 (2.4; 2.5); length of snout 5.1 (4.8; 4.9); width of fleshy interorbital space 1.3 (1.5; 1.8); length from tip of lower jaw to posterior edge of maxillary 7.7 (7.9; 8.0); postorbital length of head 14.1 (13.9; 13.8); tip of snout to posterior edge of maxillary 8.7 (9.6; 9.5); distance from snout to anus 39.1 (36.9; 39.6); distance from snout to origin of dorsal fin 44.8 (41.7; 43.8); length of longest dorsal ray 5.8 (7.5; 6.2); longest anal ray 5.8 (7.3; 7.4); longest pelvic ray (the third soft ray) 3.8 (4.8; 4.9); longest pectoral ray (middle) 8.3 (8.5; 9.5); length of longest caudal fin ray 11.9 (10.3; 11.6).

Dorsal rays 34 (35; 34; 37; 36; 35; 36; 36); anal rays 36 (35; 35; 38; 36; 36; 37; 36); pectoral rays 11 (12; 12; 12; 11; 11); pelvic rays always I, 4.

The dorsal fin origin is over that of the anal; the pelvics, always I, 4, are inserted a little in front of the base of the pectorals; the operculum is somewhat elongated posteriorly, covering the base of the pectoral fin; the suboperculum and interoperculum have a notch that fits around the anterior bases of the pelvic fins; gill openings are free from the isthmus and extend far forward; the lateral line extends along the midaxis anteriorly but posteriorly pursues a ventral course almost meeting its fellow behind the anal fin; in front of the dorsal fin along the middorsal line is a row of scales, numbering about 14, that disappear over the middle of the pectorals and they do not occur on the head; on each side of the base of the dorsal and anal fins posteriorly is a row of scales, also a few scales posteriorly on the sides of the caudal region; the slender maxillary slips into a groove under the eye; the lips or edge of the lower jaw have about 13 or 14 cirri or tiny toothlike projections on their sides but none on the tip of the lower jaw or on the upper jaw; no papillae on opercular apparatus on head; the large eyes, on front part of head, have the small pupils located anteriorly, and directed forward; interorbital space concave; anterior nostrils tubular, posterior nasal opening or a pore in front of dorsal edge of eye; premaxillary a little protractile, the fleshy snout extending in front of the tip of lower jaw, snout flattish on ventral surface and a very trifle turned upward anteriorly; villiform teeth in very narrow bands on both jaws; a patch of villiform teeth at front of palatines; no teeth on vomer; tongue narrow, free and pointed, not bilobed.

Color translucent, when alive, but pale yellowish in alcohol; eyes and sometimes tip of snout black; about 16 short brownish saddles on back, sometimes with a few fainter ones between the brown saddles near middle of length; some of the specimens are entirely pale except for the black eyes; others in addition to having the brown saddles have a brown band along the middle of the side; fins mostly pale, the caudal has a few pigment cells on some specimens.

Remarks.—This new species differs from all other closely related forms by having I, 4 pelvic fin rays, and the row of scales in front of the dorsal fin among other characters.

Some of the larger females contain large eggs in the body cavity, almost free, indicating that spawning time is near.

Named *tauensis* after the beautiful tropical island, Tau, one of the Manua group, where a series of specimens was collected.

Genus CRYSTALLODYTES Fowler

Crystallodytes FOWLER, Occ. Pap. B. P. Bishop Mus., vol. 8, p. 390, 1923. (Type, *Crystallodytes cookei* Fowler.)

CRYSTALLODYTES COOKEI ENDERBURYENSIS, new subspecies

FIGURE 25

Holotype.—A specimen (U.S.N.M. No. 116086) 61.5 mm. in standard length, collected by Leonard P. Schultz on the reef of Enderbury Island, May 15 to 19, 1939, along with 44 paratypes (U. S. N. M. No.

116087) 38 to 67 mm., bearing same data. In addition 9 paratypes (U.S.N.M. No. 116088), 24.5 to 49 mm., were taken by L. P. Schultz on the reef of Tau Island at Siulagi Point.

Description.—(Based on the holotype and paratypes listed above. Detailed measurements were made on the holotype and two paratypes and are expressed in hundredths of the standard length, 61.5 (67; 61.7) mm.; those for the holotype outside the parenthesis and for the paratypes within the parentheses, respectively.) Length of head 21.4 (21.1; 21.0); greatest depth 8.9 (7.9; 10.8); diameter of eye 2.4 (2.8; 2.6); length of snout 5.5 (5.5; 6.0); width of fleshy interorbital space 1.6 (1.5; 1.8); length from tip of lower jaw to the posterior edge of the maxillary 8.1 (8.5; 8.3); postorbital length of head 13 (11.2; 13.0); tip of snout to posterior edge of the maxillary 10.1 (10.0; 10.5); distance from tip of snout to anus 37.0 (38.3; 37.7); distance from snout to origin of dorsal fin 35.0 (33.6; 36.4); length of longest ray of dorsal fin 7.0 (7.5; 5.7); longest ray of anal 7.0 (7.5; 7.4); longest ray of pectoral 11.0 (9.7; 10.2); longest ray of pelvic 8.0 (6.7; 6.8); longest ray of caudal (middle) fin 9.7 (9.3; 9.2).

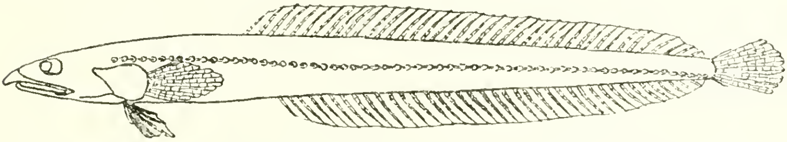

Figure 25.—*Crystallodytes cookei enderburyensis*, new subspecies: Holotype (U. S. N. M. No. 116086), 61.5 mm. in standard length.

Dorsal 41 (43; 40; 42; 43; 41; 40; 41; 40); anal 39 (39; 37; 39; 39; 39; 38; 38; 37); pectoral 13 (12; 13; 12; 13; 13; 12; 12; 12); pelvic rays always I, 5; pores in lateral line 59 (59; 59; 57; 60; 56; 58).

The origin of the dorsal fin is a little in front of the anal so that the origin of the anal is under the third to fifth dorsal ray; the pelvics are inserted in front of the bases of the pectoral fins; the operculum extends backward, covering the base of the pectoral fin; the ventral part of the opercular covering (subopercle and interopercle) is deeply emarginate and fits around the front bases of the pelvic fins; gill opening extended far forward, the gill membranes free from the isthmus; the lateral line extends along the midaxis anteriorly but has a ventral course posteriorly, almost meeting its fellow behind the anal fin; there are no scales in front of the dorsal fin and none on any other part of the body or head except along the lateral line; the maxillary is somewhat concealed by the suborbital region of the eye under which it slips; the edges of the lower jaw along their sides, (not at tip of jaw) bear about 14 or 15 tiny cirri or toothlike projections some of which are bifid; there are no other papillae or cirri on the head; the large eyes in front part of head have the pupils in anterior part directed somewhat forward and upward; interorbital space concave; anterior nostril somewhat tubular, the posterior nasal opening at upper front of eye, without tube or raised rim; premaxillary a little protractile, the fleshy snout sturgeonlike in appearance, and projecting some distance in front of tip of lower jaw; none of the rays of anal, pectoral, pelvic or dorsal fins are branched, all appear to be jointed or soft rays, however; the caudal has about 8 branched rays; a narrow band of villiform teeth on both jaws; no teeth on vomer; on palatines villiform teeth occur on head of that bone in some specimens, absent in others; tongue narrow, free and pointed.

In the body cavity of several females nearly ripe eggs occurred.

Color in life translucent, grayish white in alcohol; the larger specimens are plain in color except for the blackish eyes and one or two blackish to brownish saddles on back behind nape and a few more posteriorly that nearly reach the lateral line; some specimens are plain in color; the fins are unmarked; the extreme development of the color pattern on a 35 mm. specimen from Tau Island consists of 13 brown saddles along the back, represented by brown spots just below the lateral line on the first ten, and vertical bars reaching the anal on the last three, expanded ventrally; the pale interspaces are as long as or longer than the snout; eye and interorbital space black, sometimes the snout is black on the smaller specimens; about three pale spots in line with lower edge of eye and two more under eye; some brown pigment on under side of head, and tip of lower jaw blackish in the 24.5 mm. specimen.

Remarks.—This new form differs from the other subspecies, *C. cookei cookei* Fowler, from the Hawaiian Islands, in having 40 to 43 dorsal and 37 to 39 anal rays instead of 37 or 38 and 35 to 37 rays respectively; similarly *enderburyensis* has 56 to 60 pores in the lateral line instead of about 54 in *cookei.* Fowler reports 35 or 36 dorsal rays, 34 or 35 anal, and 47 to 55 pores in the lateral line of *cookei* from Oahu, but the two specimens from Oahu in the National Museum have the counts as reported in the comparison in the key and in my first sentence.

Named *enderburyensis* after Enderbury Island, one of the Phoenix group, where I collected numerous paratypes in a narrow deep channel, the bottom of which was covered with fine gravel. This species occurred there in great abundance.

Genus KRAEMERIA Steindachner

Kraemeria STEINDACHNER, Sitzb. Akad. Wiss. Wien, vol. 115, p. 41, 1906. (Type, *Kraemeria samoensis* Steindachner.)

KRAEMERIA SAMOENSIS Steindachner

Kraemeria samoensis STEINDACHNER, Sitzb. Akad. Wiss. Wien, vol. 115, p. 41, 1906 (type locality: Samoa).

Family CALLIONYMIDAE

DERMOSTEIRA, new genus

This genus is characterized by the long free opercular flap; long preopercular spine with eight or nine recurved teeth; the small gill opening at the upper edge of the base of the opercular flap; a membrane joining the pelvic fins with the pectoral base as far up as the fifth ray from the top; and a fleshy dermal keel along the lateral ventral margin of the body.

Genotype.—Dermosteira dorotheae, new species.

This new genus differs from all other genera in the family Callionymidae in combining the presence of a spinous dorsal fin and free opercular flap of skin with the possession of a fleshy membranous keel along the lateral-ventral angle of the somewhat triangular-shaped body.

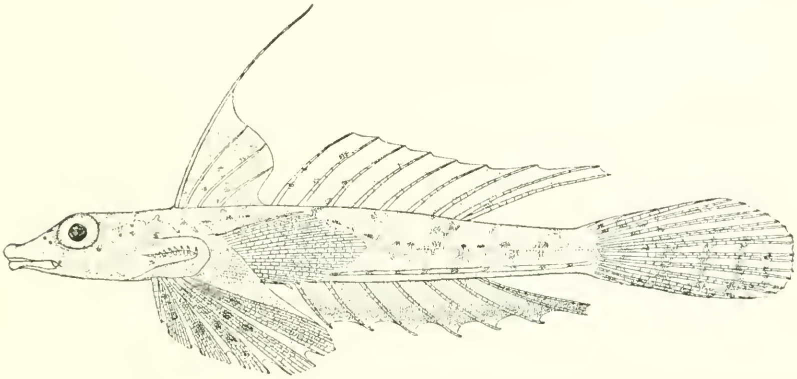

FIGURE 26.—*Dermosteira dorotheae*, new species: Holotype (U.S.N.M. No. 115735), 56.7 mm. in standard length.

Named *Dermosteira* in reference to the dermal keel on each lower side of the body.

DERMOSTEIRA DOROTHEAE, new species

FIGURE 26

Holotype.—A specimen (U.S.N.M. No. 115735) 56.7 mm. in standard length (total length 75) taken June 11–14, 1939, by Leonard P. Schultz on the reef at Rose Island.

Description.—(Based on the holotype, the only known specimen. All measurements are expressed in hundredths of the standard length.) Length of head 31.8; postorbital length of head 17.3; greatest depth of body 12.5; distance from upper base of preopercular spines to its tip 10.0; length of snout 9.5; diameter of eye 7.6; distance from tip of snout to posterior edge of maxillary 9.7; distance from tip to snout to origin of dorsal 28.8; snout to origin of anal fin 48.5; snout to insertion of pelvic fins 24.7; distance from posterior edge of anal fin to midbase of caudal fin 21.2; least depth of caudal peduncle 6.7; length of longest or first spinous ray of dorsal 42.3; length of longest or last ray of soft dorsal 26.5; length of longest or last ray of anal 19.8; length of longest ray of pectoral fin 21.9; length of longest pelvic fin 27.7; length of caudal fin 33.2; width of body at rear of head 16.5; interorbital space 1.6.

Dorsal fin IV—8; anal 7; pectoral R. 17—L. 18; pelvics 1, 5; caudal 10; about 6 or 7 gill rakers on first gill arch.

Head depressed, the snout depressed and flattish, a trifle concave; snout projects a little beyond lower jaw, the latter below the premaxillaries, which when retracted do not extend quite to the tip of the snout; villiform teeth on premaxillaries in two large patches each side at front of jaw, then a toothless space followed by a narrow band of villiform teeth; lower jaw with a narrow band of villiform teeth; no teeth on vomer or palatines; the free dermal flap at rear of head nearly equals the diameter of the eye.

The gill membranes are joined to the shoulder and isthmus so that the gill opening consists of a small round pore; the pelvic fin has I spine and five branched rays; the last ray has a membrane that joins the base of the pectoral fin at the fifth ray; body somewhat triangular in cross section, the lower lateral-ventral angles each with a fleshy or dermal keel commencing opposite origin of anal fin and continuing to caudal peduncle ("dermosteira"); eighth ray of pectoral longest; lateral line begins a little above gill opening and continues somewhat arched above the pectoral, then just behind tips of pectorals continues along the midaxis of the body ending at the base of the caudal fin, along the lateral line at irregular intervals are very short canals coming off at right angles; the "dermosteira" does not appear to be associated with a lateral line canal; anal papilla simple; peritoneum white.

Color pale with numerous faint areas of blackish pigment, these arranged irregularly but in more or less of a row of faint spots along lateral line and along the "dermosteira"; anal fin pale dusky, the tips of the rays white; caudal with five faint bars. In life the color was mostly white and pinkish shades and light greenish above.

Remarks.—This new species differs from all other callionymids in the presence of the "dermosteira" along each side of the body.

Named *dorotheae* in honor of my wife, Dorothea Bowers Schultz, who has helped me in numerous ways in connection with my ichthyological studies.

Family PARAPERCIDAE

Genus PARAPERCIS Bleeker

Parapercis Bleeker, Ned. Tijdschr. Dierk., vol. 1, p. 236, 1863. (Type, *Sciaena cyclindrica* Bloch.)

PARAPERCIS TETRACANTHUS (Bleeker)

Percis tetracanthus Bleeker, Nat. Tijdschr. Ned. Ind., vol. 4, p. 458, 1853.

115416, Rose Island, lagoon, June 12 to 20, 1939, 3 specimens.

115413, Canton Island, reef at ocean, April 25–28, 1939, 3 specimens.

115414, Canton Island, reef of the widest shallow channel, May 13, 1939, 7 specimens.

115415, Rose Island, reef, June 11–14, 1939, 2 specimens.

115417, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 1 specimen.

115418, Tau Island, reef at Siulagi Point, June 27, 1939, 7 specimens.

52283, Apia, Samoa, Jordan and Kellogg, 3 specimens.

Family BLENNIIDAE

KEY TO THE GENERA OF BLENNIIDAE FROM THE PHOENIX AND SAMOAN ISLANDS

1*a*. Body naked, without scales; snout blunt, rounded.
  2*a*. Teeth in upper and lower jaws in a single row, fixed or firm.
    3*a*. Gill membranes joined to each other across isthmus to form a free fold. **Blennius Linnaeus**
    3*b*. Gill membranes joined to side of head, gill opening restricted to side of head, no free fold across isthmus.
      4*a*. Dorsal and anal attached to caudal fin; gill opening extending downward at least in front of base of pectoral fin; dorsal XII, 15; anal 17; canine at each corner of upper jaw evident by lifting up lip; also one at each corner of lower jaw______________ **Enchelyurus Peters**
      4*b*. Dorsal and anal never both attached to caudal; gill membranes above upper angle of base of pectoral fin___________ **Petroscirtes Rüppell**
  2*b*. Teeth in jaws very fine, numerous, set on gums so that they are easily depressible; gill membranes joined to each other across isthmus to form a free fold.
    5*a*. A fringe of small tentacles across nape; pelvic rays I, 4; canines present_____________________________________ **Cirripectes Swainson**
    5*b*. No fringe of tentacles across nape.
      6*a*. Pelvic rays I, 4; tips of rays of caudal fin much exserted; canines present___________________________________ **Rupiscartes Swainson**
      6*b*. Pelvic rays I, 2 or I, 3; tips of rays of caudal fin barely extending past membranes; canines present or absent_______ **Salarias Cuvier**
1*b*. Body with scales; snout pointed, tapering in front of eyes; three dorsal fins____ **Enneapterygius Rüppell**

Genus BLENNIUS Linnaeus

Blennius Linnaeus, Systema naturae, ed. 10, vol. 1, p. 256, 1758. (Type, *Blennius ocellaris* Linnaeus, as restricted by Jordan and Gilbert, 1883.)

KEY TO THE SPECIES OF BLENNIUS FROM THE PHOENIX AND SAMOAN ISLANDS

1*a*. Peritoneum pale; no projecting dermal flap near corner of lower lip; dorsal rays XII, 19; anal 22 or 23; canines present; soft dorsal not joined to caudal fin; nasal tentacle short, simple; cirrus on each eye simple, as long as diameter of eye; no cirrus on nape; crest undeveloped; depth 5¾ to 5⅞; head about 4⅔; eye 3¾; height of longest soft dorsal ray 1¾ times in head; pelvic rays I, 2 or I, 3; pectorals 14, tenth ray longest; spiny dorsal continuous with soft dorsal or only a slight emargination between the two fins; color pale; most conspicuous color patterns are six or seven obscure bars or distinct blotches along midsides of body and three narrow transverse dark lines across chin and throat; narrow black line across chin between corners of mouth; second bar from cheeks across middle of gill membranes, third along rear margin of gill membranes but usually absent below isthmus________ Blennius rhabdotrachelus Fowler and Ball

1*b*. Peritoneum black; soft dorsal not joined to caudal; canines present; no dermal flap near corners of lower lip; dorsal rays XII, 18 or 19 (usually 18); anal 22 or 23; nasal tentacle small, simple; cirrus on each eye, simple, as long as eye diameter; no cirri on nape; crest indicated as a slight ridge on males; depth 5½; head 4⅓; eye 3⅞; height of longest ray of soft dorsal 1⅗ in head; pelvic rays I, 2 or I, 3; pectorals 14, tenth ray longest; spiny dorsal continuous with soft dorsal or only a slight emargination where the fins join; color pale, about seven dusky bars with pigment intensified along the midaxis to form blackish blotches; above these along base of dorsal the bars are double, and between each two black blotches along midaxis anteriorly on body are small black spots; base of caudal fin with a blackish spot; lower rays of caudal darker than upper rays; pectoral plain, the base with a few white spots, similar to white spots on head; white spots, ringed with black line, arranged in a row behind and below eye and irregularly in two rows on opercular apparatus; spiny dorsal with a longitudinal blackish line or narrow band halfway out on rays, below this three to five blackish areas, rest of fin pale; soft dorsal with the bars on body extending up on basal third of this fin; anal, pectoral, and pelvics pale; sometimes head darker than rest of body; a wide pigmented band extends across chin and gill membranes below.
Blennius snowi Fowler

BLENNIUS RHABDOTRACHELUS Fowler and Ball

Blennius rhabdotrachelus Fowler and Ball, Proc. Acad. Nat. Sci. Philadelphia, 1924, p. 272.

115509, Enderbury Island, reef, May 15–19, 1939, 57 specimens.
115505, Swains Island, reef, May 3–9, 1939, 32 specimens.
115511, Canton Island, lagoon, April 23 to May 12, 1939, 1 specimen.
115407, Canton Island, reef, ocean side, April 26–28, 1939, 40 specimens.
115512, Rose Island, reef, June 11–14, 1939, 23 specimens.
115408, Tau Island, reef at Siulagi Point, June 27, 1939, 1 specimen.
115510, Hull Island reef, July 12–15, 1939, 64 specimens.
115506, Hull Island, channel, July 8–12, 1939, 16 specimens.

BLENNIUS SNOWI Fowler

Blennius snowi Fowler, Mem. B. P. Bishop Mus., vol. 10, p. 431, fig. 71, 1928.

115502, Canton Island, reef at ocean, April 25–28, 1939, 61 specimens.
115504, Swains Island, reef, May 3–9, 1939, 46 specimens.
115500, Enderbury Island, reef, May 15–19, 1939, 107 specimens.
115503, Hull Island, channel, July 8–12, 1939, 33 specimens.

115499, Hull Island, reef, July 12–15, 1939, 20 specimens.
115501, Hull Island, shallow tidepool on reef, July 13, 1939, 103 specimens.

Salarias walensis Herre[35] is undoubtedly this species.

Genus ENCHELYURUS Peters

Enchelyurus PETERS, Monatsb. Akad. Wiss. Berlin, 1868, p. 268. (Type, *Enchelyurus flavipes* Peters.)

ENCHELYURUS ATER (Günther)

Petroscirtes ater GÜNTHER, Journ. Mus. Godeffroy, vol. 6, pt. 11, p. 109, pl. 115, fig. C, 1877.

51788 (type of *Hypleurochilus vaillanti* Jordan and Seale).
52248, Apia, Samoa, Jordan and Kellogg, 11 specimens.
52251, Samoa, Jordan and Kellogg, 12 specimens.

Genus PETROSCIRTES Rüppell

Petroscirtes RÜPPELL, Atlas zu der Reise im nördlichen Afrika, Fische, p. 110, 1828. (Type, *Petroscirtes mitratus* Rüppell.)

KEY TO THE SPECIES OF PETROSCIRTES FROM THE PHOENIX AND SAMOAN ISLANDS[36]

1*a*. Dorsal rays 38; anal 28; pectoral 14; black band from nose to end of caudal fin; margins of anal and dorsal white, middle of these fins with black band, base pale (blue in life); eight barbels on under side of head (chin and throat) .... **Petroscirtes azureus Jordan and Seale**
1*b*. Dorsal rays fewer than 35.
  2*a*. Dorsal rays 30 to 34.
    3*a*. Anal rays 22 to 24; dorsal rays usually 32 or 33; black spot behind eye and several transverse bands on lower half of head; anal with white spots along its base and a darker margin. **Petroscirtes obliquus Garman**
    3*b*. Anal rays 18 or 19; dorsal rays usually 31 to 33; anal pale; dorsal with a longitudinal blackish band through its middle **Petroscirtes atrodorsalis Günther**
  2*b*. Dorsal rays 25 or 26; anal 16 or 17; pectoral 14 or 15; several multifid tentacles under chin, probably absent on young, tentacle over eye; tentacles on gill cover and nape; a few brown specks on dorsal fin near margin .... **Petroscirtes mitratus Rüppell**

PETROSCIRTES AZUREUS Jordan and Seale

Petroscirtes azureus JORDAN and SEALE, Bull. U. S. Bur. Fish. (1905), vol. 25, p. 432, fig. 109, 1906.

51796 (type of *Petroscirtes azureus* Jordan and Seale), Apia, Samoa, Jordan and Kellogg.

This species may be the same as *P. taeniatus*, if the latter has cirri on the chin.

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[35] Field Mus. Nat. Hist. Zool. Ser., vol. 18, No. 12, 1935.

[36] My material of this genus is not sufficient to give an adequate analysis of the species from the region under consideration.

PETROSCIRTES OBLIQUUS Garman

Petroscirtes obliquus GARMAN, Bull. Mus. Comp. Zool., vol. 29, p. 237, pl. 4, fig. 3. 1903.

52240. Apia, Samoa, Jordan and Kellogg, 1 specimen.

PETROSCIRTES ATRODORSALIS Günther

Petroscirtes atrodorsalis GÜNTHER, Journ. Mus. Godeffroy, vol. 6, pt. 11, p. 198, pl. 115, fig. B, 1877.

52242, Pago Pago, Samoa, Jordan and Kellogg, 1 specimen.

PETROSCIRTES MITRATUS Rüppell

Petroscirtes mitratus RÜPPELL, Atlas zu der Reise im nördlichen Afrika, Fische, p. 111, pl. 28, fig. 1, 1828.

115531 Canton Island, lagoon, May 25–26, 1939, 3 specimens.

51797 (type of *Petroscirtes xestus* Jordan and Seale), Pago Pago, Samoa, Jordan and Kellogg. Since there are but 26 dorsal rays and 16 anal rays, *P. xestus* could not possibly be referred to *P. atrodorsalis* as was done by Fowler.

52243, Apia, Samoa, Jordan and Kellogg, 1 specimen.

Genus CIRRIPECTES Swainson

Cirripectes SWAINSON, The natural history and classification of fishes, amphibians and reptiles, or monocardian animals, vol. 2, p. 275, 1839. (Type *Salarias variolosus* Valenciennes.)—SCHULTZ, Copeia, 1941, no. 1, pp. 17–20, fig.

KEY TO THE SPECIES OF CIRRIPECTES FROM THE PHOENIX, SAMOAN, AND HAWAIIAN ISLANDS

1*a*. Body and pectoral fin everywhere covered with black spots on a paler background.

2*a*. Dorsal rays XIII, 12 or 13; anal 15 or 16; about 30 to 34 tentacles in fringe across nape; the black blotches on body arranged in groups of four to six spots that in turn more or less form five or six double bars; black spots on dorsals and caudal and pectoral fins; anal fin blackish; nasal tentacles short multifid; on each eye cirrus has a constricted base, expanded distally and with the outer edges broken up into numerous cirri; upper lip with about 24 papillae; lower lip plicate or convoluted and somewhat papillate; at each side of chin occurs a pair of barbels adjoining a pair of pores; canines absent; all anal rays of female normal; first two anal rays on the male (standard length of specimen from Oahu 83 mm.) are swollen, and much convoluted.
Cirripectes leopardus (Day)

2*b*. Dorsal rays XII (rarely XIII), 14; anal 17; about 50 to 60 tentacles in fringe across nape (inner row of tentacles at occiput not included in this count); black spots everywhere on body and fins, vertical fins often lack the black spots and are plain blackish; nasal tentacles short, multifid; on each eye the numerous cirri arise from a broad double base; lower lip convoluted; no barbels or pores on sides of chin; canines present; first two anal rays on males swollen and convoluted; description based on five females and one male, standard length 73 to 90 mm.
Cirripectes brevis (Kner)

1*b*. Body and fins plain blackish or brownish, sometimes with pale spots posteriorly and sometimes young with several bars on a pale background of color but never uniformly black spotted; pectoral fin plain without spots.

3a. Tentacle over eye simple, rarely bifid; anterior half of body pale, posteriorly brownish, this pale area with a few scattered blackish spots on body and head, some with pale centers, on other specimens black spots lacking, blackish area posteriorly usually pale spotted, these pale spots occurring on soft dorsal and anal fins; when blackish color extends as far forward as head pale spots occur there also, sometimes arranged in irregular rows, longitudinally; middle of lower lip smooth crenulate, only the sides of lower lip convoluted; upper lip crenulate; no barbels on chin; dorsal rays 15 (rarely 14); anal rays 18 (rarely 17); about 28 to 43 cirri in the fringe across nape; canines present; first two anal rays swollen and convoluted. **Cirripectes jenningsi, new species**

3b. Tentacles over eye two to five (rarely one to five), these arising from a common base; no pale spots in posterior half of body; first dorsal spine of male longer than second [*Cirripectes filamentosus* (Alleyne and Macleay)], first dorsal spine of female as long as second, seldom shorter; anterior distal one-third to two-thirds of spiny dorsal white; abruptly darker basally; body and fins plain brownish to blackish (purplish in life), often paler anteriorly, and often with paler blotches on head, especially on lower sides and throat; body sometimes with about 13 transverse bars; lower half of caudal fin darker than upper half; dorsal rays XII (rarely XIII), 14 or 15; anal 17 to 19; about 30 to 40 cirri in fringe across nape------ **Cirripectes variolosus (Valenciennes)**

TABLE 31.—*Counts made on various species of* Cirripectes

Species	Dorsal soft rays				Anal rays				Cirri in fringe on one side of nape														
	12	13	14	15	16	17	18	19	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
leopardus	1	---	---	---	1	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---
brevis	---	---	6	---	---	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	3	2
jenningsi	---	---	1	10	---	1	10	---	1	---	---	2	3	4	1	---	---	---	---	---	---	---	---
variolosus	---	---	14	4	---	13	4	1	5	6	3	1	2	3	---	---	---	---	---	---	---	---	---

CIRRIPECTES LEOPARDUS (Day)

Salarias leopardus DAY, Proc. Zool. Soc. London. 1869, p. 518.

115703, Rose Island, reef, June 11-14, 1939, a 73-mm. female specimen.

CIRRIPECTES BREVIS (Kner)

Salarias brevis KNER, Sitzb. Akad. Wiss. Wien, vol. 58, pt. 1, pp. 29, 334, pl. 16, fig. 18, 1868.

115498, Enderbury Island, reef, May 15-19, 1939, 5 specimens, 1 male, 4 females.

115497, Tutuila Island, Fagasa Bay, rock pools, June 5, 1939, 1 female.

CIRRIPECTES JENNINGSI, new species

FIGURE 27

Holotype.—A male (U.S.N.M. No. 115486) 64 mm. in standard length, taken May 3–9, 1939, by Leonard P. Schultz on the reef at Swains Island.

Allotype.—A female 64.5 mm. in standard length, with same data. Along with the types designated above were taken 26 paratypes (U.S.N.M. No. 115487), also with same data, measuring 38.5 to 68.7 mm. in standard length.

Description.—(Based on holotype, allotype, and 26 paratypes as listed above. Detailed counts and measurements of the holotype and allotype are given first, followed by those for two paratypes in parentheses, respectively—standard length 64.5, 64.0 (68.7, 52.3); sex ♂, ♀ (♀, ♂); all measurements are expressed in hundredths of the standard length.) Length of head, 28.7; 29.2 (28.6; 28.3); length of snout 13.9; 13.9 (14.4; 13.8); diameter of eye 7.1; 7.0 (6.7; 7.5); postorbital length of head 18.7; 18.5 (18.8; 18.2); greatest depth of body 32.6; 35.0 (34.0; 35.2); least depth of caudal peduncle 11.5; 11.3 (11.2; 11.9); length of caudal peduncle or distance from base of last anal ray to mid-base of caudal fin 10.1; 9.5 (9.2; 9.6); tip of snout to origin of dorsal fin 29.5; 31.2 (31.6; 30.6); tip of snout to origin of anal fin 51.6; 54.6 (57.6; 53.5); interorbital space (fleshy) 2.8; 3.0 (2.8; 3.2); preorbital distance 7.0; 7.3 (7.8; 7.5); length of mouth 13.3; 13.0 (12.5; 13.4); longest ray of pectoral fin, usually the 10th 22.3; 26.3 (23.3; 26.2); longest ray of soft dorsal about 10th 22.9; 21.4 (20.8; 23.7); longest ray of spiny dorsal 23.3; 23.4 (18.9; 25.6); longest ray of pelvic fin 16.3; 17.2 (18.8; 17.8).

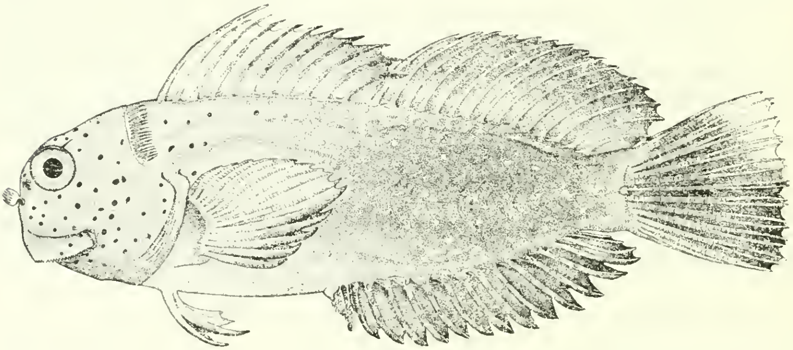

FIGURE 27.—*Cirripectes jenningsi*, new species: Holotype (U.S.N.M. No. 115486), 64 mm. in standard length.

Dorsal rays XII, 15; XII, 15 (XII, 15; XII, 15); anal rays 18; 18; (18; 18); pectoral rays 15; 15 (15; 15); pelvic fin rays I, 4; I, 4 (I, 4; I, 4); total number of tentacles on nape 28; 38 (38; 43);

number of nasal tentacles 6–6; 6–7 (5–5; 5–5); number of tentacles over eyes 1–1; 1–1 (1–1; 1–1).

Peritoneum pale dusky; upper lip strongly crenulate; lower lip less crenulate, the middle nearly smooth; lateral line with arch over pectoral fin and then continuing along midaxis of body ending at base of caudal fin; canines present at corners of lower jaw inside of the mouth, no canines on upper jaw.

Color of anterior half of body pale, posteriorly brownish (in life the color was purplish black to dark bluish, and rose-red anteriorly) the pale area with a few scattered blackish spots on body and head, some with pale centers, while on others the black spots are lacking; the blackish area posteriorly is usually pale (white in life) spotted, these pale spots occurring on soft dorsal and anal fins; when the blackish color extends as far forward as head the pale spots occur there also, sometimes arranged in irregular rows, longitudinally; sometimes the body is crossed with one or two vertical stripes; tips of rays of dorsal lobe of caudal fin white, rest of fin blackish; lower half of pectoral blackish, upper half pale; lips pale; basal area of dorsals often pale, while distally they are blackish.

Remarks.—This species may be distinguished by a single tentacle over the eye and its color pattern of darkish spots anteriorly and pale spots posteriorly.

Named *jenningsi* after Mr. Jennings whose grandfather from Long Island settled and colonized Swains Island in 1856. It was through Mr. Jennings' kindness that my visit to his Island was made most pleasant.

CIRRIPECTES VARIOLOSUS (Valenciennes)

Salarias variolosus VALENCIENNES, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 11, p. 317, 1836.

115488, Enderbury Island, reef, May 15–19, 1939, 127 specimens.
115494, Hull Island, channel, July 7–17, 1939, 78 specimens.
115496, Hull Island, reef, July 12–15, 1939, 57 specimens.
115493, Hull Island, channel, July 8–12, 1939, 5 specimens.
115489, Canton Island, lagoon, April 23 to May 12, 1939, 2 specimens.
115492, Tau Island, reef at Siulagi Point, June 27, 1939, 2 specimens.
115490, Tutuila Island, Fagasa Bay, rock pools, June 5, 1939, 23 specimens.
115495, Swains Island, reef, May 3–9, 1939, 3 specimens.
115491, Rose Island reef, June 11–14, 1939, 4 specimens.
52294, Apia, Samoa, Jordan and Kellogg, 5 specimens.

Genus RUPISCARTES Swainson

Alticus LACEPÈDE, Histoire naturelle des poissons, vol. 2, pp. 458, 478, 1800. (Type, "Alticus saltatorius, pinnâ spuria in capitis vertice.")

Rupiscartes SWAINSON, The natural history and classification of fishes, amphibians and reptiles, or monocardian animals, vol. 2, p. 275, 1839. [Type, *Salarias alticus* Cuvier and Valenciennes (= *Blennius salicus* Lacepède).]

RUPISCARTES SALIENS (Lacepède)

Blennius saliens Lacepède, Histoire naturelle des poissons, vol. 2, p. 479, 1800.

The following description is based on the specimens collected by me at Tutuila Island and Tau Island. Apparently this remarkable species does not occur on the low coral atolls of the Phoenix Islands.

Pelvic rays I, 4; depth about 7½ in the standard length; dorsal rays XIV, 23; anal 28 or 29; pectoral 15, the ninth or tenth ray longest; tips of caudal rays exserted; lips crenulate; snout projects a little in front of eye; nasal cirrus simple, very small; multifid cirri on top of each eye; no cirrus on nape; crest well developed on males; canines present; dorsal fin not joined to caudal; dorsals somewhat joined, about one-third to one-half of first soft ray, the notch a deep emargination; peritoneum black; color blackish, with about 11 pale blotches along base of dorsal and numerous vertical pale lines on side of body, about 12 pairs of these whiter than the others; caudal fin blackish, very intense posteriorly; head, body anteriorly, also base of pectorals covered with small black spots, except the ventral surface of head and body, these spots most distinct on breeding males; dorsals and anals blackish with tips of rays pale; lateral line probably undeveloped externally.

This species is abundant on the lava rocks and in the small pools at the upper limits of the wave action. Here it may be seen skipping about in tiny trickles of water and ascending the bare face of rocks to a height of 6 or 8 feet. No other blenny is so nimble on the reefs as this species. I did not find it on the coral atolls, only on islands where lava rocks occurred.

115446, Tutuila Island, Fagasa Bay, rock pools, June 5, 1939, 105 specimens.

115447, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 25 specimens.

115445, Tau Island, reef at Siulagi Point, June 27, 1939, 18 specimens.

52262, Pago Pago, Samoa, Jordan and Kellogg, 3 specimens.

Genus SALARIAS Cuvier

Salarias Cuvier, Règne animal, vol. 2, p. 251, 1817. (Type, *Salarias quadripennis* Cuvier.)

KEY TO THE SPECIES OF SALARIAS FROM THE PHOENIX AND SAMOAN ISLANDS

1*a*. Spiny dorsal continuous with soft dorsal or only a slight emargination between two fins, no deep notch in membrane between next to last spine and first soft ray; peritoneum black; depth of body contained in standard length fewer than 4 times; soft dorsal joined to caudal fin for one-fourth to one-fifth of upper ray; a dermal flap at rear corners of lower lips projecting one-half to two-thirds pupil; canines absent; dorsal rays XII, 20; anal 21; pelvics I, 2 or I, 3; pectoral 14, 10th ray of pectoral longest; nasal tentacles long, trifid or bifid; 1 to 3 cirri, over each eye, about one-half diameter of eye; nape with a pair of broad-based multifid cirri; crest undeveloped; depth 3⅓; head 4¾; eye 4; height of longest soft dorsal ray 1⅛ in head; lips not crenulate; color light brownish with numerous fine horizontal parallel lines in upper two-thirds of body anteriorly; pale oval spots on body, more distinct ventrally; seven or eight bars on young, fading on adults, with pale spots; below base of spiny dorsal and above pectoral body peppered with fine dots; body bars extending on base of dorsals; dorsals marked with a few oblique rows of pale spots in large adults and with rows of black specks in young; pectoral and caudal fins crossed with a few rows of black spots; anal with two or three almost longitudinal rows or lines of blackish color; pelvics with three or four black spots; narrow blackish line over belly between bases of pectorals, chin with irregular obscure black and white bars. **Salarias fasciatus** (Bloch)

1*b*. Dorsals with a notch between spines and soft rays, membrane sometimes joined as much as one-third of first soft ray.

2*a*. Canines absent at each corner of lower jaw; peritoneum dusky to jet black; membrane of spiny dorsal joined one-fourth to one-third of distance out the first dorsal soft ray.

3*a*. Dorsal rays XII or XIII, 19 to 23; anal rays, 23 to 25; soft dorsals joined one-fifth to one-third of upper ray of caudal fin except in very small specimens; nasal cirri short, multifid; crest well developed on males.

4*a*. Cirri on eyes simple (rarely with a branch), as long as diameter of eye; one pair of long simple tentacles on nape; dorsal rays XII or XIII, 19 to 22; anal 22 to 24; depth 4½; head 4¼; eye 4¾ to 4⅞; height of longest soft dorsal ray in head 1⅕ to 1¼; lips not crenulate; on breeding males sides of tips of second or third to ninth anal rays enlarged and pitted or convoluted; color grayish brown to blackish, with four to six double bars, rather indistinct with pale interspaces on adults narrow to wide lines, those on females wider than on males, often equal to width of a bar and more distinct; posterior part of body with black spots more or less arranged in rows; bars extending on base of dorsal fin, intensified to form double black blotches; a pale oblong spot in midbase of caudal fin rays, bordered above and below with black pigment; caudal fin plain grayish on females, blackish on males; spinous and soft dorsal finely spotted on females; males almost plain blackish, but obscure somewhat oblique pale lines on dorsal fins, entirely absent on many males, obvious on a few; anal, pelvics, and caudal plain, paler in females than males; an obscure, oblique, blackish bar behind eye about as wide or wider than pupil and as long as eye diameter; anal sometimes on males with a pale horizontal line near its middle but usually obscure; females often with white specks on head and body (reddish in life); sometimes a silvery spot at rear base of soft dorsal_______ **Salarias edentulus** (Bloch)

4*b*. A wide, broad-based cirrus on each eye, with its edges fringed, one-third to one-half length of eye diameter; no tentacles on nape; dorsal rays XII or XIII, 23; anal 24 or 25; depth 6; head 5¾; eye 3⅞; height of longest soft dorsal ray one in head; lips crenulate; color grayish to brown with five to seven faint horizontal pale streaks and dark lines, most obvious on sides of body below soft dorsal, dark lines ending in small dots and broken lines on caudal peduncle; body with about 12 obscure brownish bars, obsolete in males and large females; soft dorsal with white margin, then a submarginal blackish line, rest of fin plain grayish; all fins unspotted, plain grayish brown; head darker than body; caudal fin plain, pale; midbase of caudal fin with a pale oblong bar, bordered with diffuse blackish; pectoral and pelvics plain pale.

Salarias lineatus Valenciennes

3*b*. Dorsal rays XII, 16 or 17; anal rays 19 or 20; soft dorsal free from caudal fin; nasal tentacles probably simple; cirrus over eye simple; pair of simple tentacles on nape; depth about 4½; head 4⅓; eye 3⅓; height of longest ray of soft dorsal about 1½ in head.

5*a*. Color light brown, everywhere with numerous small white spots.

Salarias alboguttatus Kner

5*b*. Color pale brown, with about four rows of brown spots made up of fine specks, the spots in the two lower rows much larger than those in the upper rows; two rows of oblong, pearly white spots, commingled with the two lower rows of brown spots; above these are numerous small pearly spots; head covered with many pearly and brown specks; a dark streak behind eye; behind this a dark band extending from nape diagonally downward and forward to throat; under side of head pale, with white specks; a small black spot on each side of throat; chin and upper lip with black streaks; margin of dorsal dark, base of pectoral covered with pearly white spots (after Jordan and Seale)____ **Salarias guttatus Valenciennes**

2*b*. Canines present near corners of lower jaw inside of mouth.

6*a*. Background color of body pale, with four distinct, parallel, black, longitudinal lines on midsides of body, these ending on region of caudal peduncle in series of broken lines or black dots, the upper three black lines in a group, then a space and the fourth line in middle of lower half of side; anal with a black line near its base, rest of fin dusky; caudal fin barred; in small specimens, in addition to black lines side of body with seven or eight bars, ventrally U- or V-shaped; lower lip pigmented, then a pale area or bar behind it on chin; gill membranes ventrally dusky; pelvics and pectorals plain pale; snout with bar in midline, then one each side; a trace of black pigment area behind eye; dorsal rays XIII, 20 or 21; anal about 22; peritoneum jet black; nasal tentacle trifid from pediclelike base; simple cirrus on each eye ½ to ⅔ of eye; no cirrus on nape; crest undeveloped; soft dorsal not joined to caudal; depth in length 4¾; head 4⅓ to 4½; eye 3½; longest pelvic ray $1\frac{9}{10}$ to 2 in head; longest soft dorsal ray 1⅞ in head; dorsals deeply notched.

Salarias caudolineatus Günther

6*b*. Color not as in 6*a*.

7*a*. Dorsal rays XII or XIII, 13 to 17; anal rays 17 to 19 (usually 18); cirri on eye multifid, either a central axis with long filaments coming off its sides (not mere fringes but long cirri) or a long simple cirrus at outer side of eye with multifid cirri coming off its inside base; nape with a pair of simple cirri; nasal cirri multifid; soft dorsal not joined to caudal.

8*a*. Peritoneum blackish; a central cirrus over each eye with long filaments coming off its sides, one-third length of eye; crest undeveloped; upper lips crenulate; dorsal rays XII or XIII, 15 to 17; anal 18 or 19; depth 5⅕; head 3⅘ to 4; eye 4⅕; pelvics 1½ in head; longest soft dorsal ray 2 in head; deep notch between dorsals; color light brownish, body everywhere covered with small black spots most intense on sides, these helping to form about five or six vertical bars, often unbroken on upper sides; ventrally white predominates between the fewer black spots; a very distinct black bar, inclined obliquely, occurs behind eye, its length nearly equal to diameter of eye, lower sides of head and in front of pectoral with pale (white) spots or marbling; chin and gill membranes with about six white lines radiating from over base of pelvics, the one in midline forms a Y, and the next a V, these persist in the half-grown and young too; dorsals and caudal barred with rows of black spots; anal with tips of rays white then a darkish submarginal blackish band or row of diffuse spots, base of anal rays pale; pelvics and pectoral plain pale, unspotted__ **Salarias marmoratus** (Bennett)

8b. Peritoneum pale; multifid cirri on each eye, usually with a long simple one at outside, with multifid cirri coming off its inside base, the simple one as long as eye; upper lips crenulate near corners of mouth; dorsal rays XII or XIII, 13 to 15, anal 17 or 18; depth 4½; head 4; eye 4⅔; pelvics 1⅔ in head; longest soft dorsal 1⅔; dorsals with deep notch; anal fin of males with the tips of the first to fifth rays greatly enlarged, convoluted, and separated from each other; color pale or light brown or tan; in adults a large black spot behind head in upper two-thirds of body, above and a little behind base of pectoral, lateral line bordering upper edge of this black spot; three pairs of pale lines radiating outward on under side of head from below isthmus on gill membranes and on chin; dorsals, caudal, and anal blackish with traces of bars; a dark spot behind eye, about twice as long as wide, its length equal to diameter of pupil; adult males—spiny dorsal with white margin, and black blotches between each spine, the spines white; soft dorsal with numerous bars, running obliquely; caudal barred; tips of anal rays pale, rest of fin blackish; lower rays of pectoral blackish; pelvics dusky; middle area of chin dusky longitudinally; isthmus dusky; side of body with five or six bars, rather faint; upper lip with 10 narrow vertical bars extending on snout; cheek with some blackish areas. In young the black spot, smaller than pupil, persists, but other color marks are absent. **Salarias thalassinus** (Jordan and Seale)

7b. Dorsal rays XII or XIII, 17 to 21 (if dorsal rays are 17, cirri over eye not multifid); anal rays 18 to 24; cirri over eye simple or simple with edges fringed, not as described in *7a*.

9a. Lateral line ends under last one-third of soft dorsal; depth 3¾; head 3¾; eye 4½ in head; pelvics 1½; longest soft dorsal ray 1½ in head; dorsals notched but joined one-fourth to one-third of first soft dorsal ray; dorsal rays XIII, 17; anal 19 or 20; peritoneum dusky to black, paler in young; cirrus on each eye simple in young, simple but with fringed edges in adults, one-third to one-half diameter of eye; nasal tentacles multifid but simple in young; pair of cirri on nape; crest undeveloped; soft dorsal free from caudal fin; color pale tan or light grayish brown, with head and body covered with black spots and reticulated lines, these arranged along midaxis as nearly parallel lines, somewhat broken and a few branching to join others; pectorals with three or four rows of transverse black spots; caudal with several transverse rows of black spots; dorsals with oblique rows of spots; anal with two or three longitudinal black lines or rows of spots; the young do not have parallel blackish broken lines or spots on body but seven or eight double black bars, the width of these lines not wider than pupil; along midaxis of body of young middle three have formed in their centers a black-bordered round pale spot---------------------------- **Salarias aneitensis Günther**

9*b*. Lateral line ending under spiny dorsal or below the notch between dorsals; greatest depth of body is contained more than 4½ times in standard length; peritoneum dusky to black.

10*a*. Pair of cirri on eyes simple, long, and slender; for about two-thirds to three-fourths of eye diameter they are unbranched and not with fringed edges; nasal tentacles multifid.

11*a*. Dorsal rays XIII, 20 or 21; anal rays 23 or 24; arch of lateral line descending to midaxis of body and ending under last third of spiny dorsal; a pair of tentacles on nape except in breeding males with crest developed; in breeding males soft dorsal joined to caudal as much as one-fifth to one-fourth of upper caudal fin ray, but mostly free in females; depth 5⅔ to 6⅓; head 4¾, to 5; eye 3⅔ to 4; pelvics 1½ to 2 in head; longest soft dorsal rays 1⅒ to 1⅓ in head; dorsals deeply notched but membrane attached to one-fifth to one-fourth of first soft dorsal rays; upper lip somewhat crenulate; color of breeding males brown, with about eight indistinct bars or blotches; sides with two rows of blackish (probably pale centers in life) spots, one above and other below midaxis of body, a few other such spots scattered on sides; dorsals, caudal, and anal fins plain blackish; pectorals and pelvics plain pale; upper part of opercle with a distinct blotch or spot; color of immature males and of females—light brown to nearly white, with seven or eight vertical bars Y- or V-shaped below midaxis of body (open part of Y or V situated ventrally); often in each bar a pair of small, black-bordered, pale (blue) spots, these in two longitudinal rows, one near midaxis of body and other about midway to dorsal line; behind eye a persistent oblong pale area, with a dark, sometimes blackish, posterior border; also another blackish spot on opercle, often obscure; dorsals pale, with body bars sometimes extending on rays; caudal mostly pale, a small light area near base on ray at axis, bordered above and below with blackish pigment; margin of anal dusky, but tips of rays white, basal three-fourths of anal whitish; lower lip with patch of black pigment each side of midline; upper lip at midline pigmented and another area at each side, interspace pale; chin sometimes with a diffuse black transverse bar; in very small specimens bars mostly represented by a pair of spots above axis and another pair halfway down below axis of body. Color in life over coral sand; dorsal fin pale orange; bars on sides, U-shaped below, orange-brown; dorsal half of caudal region pale green; caudal fin pale green; spots on sides silvery white bordered with orange-brown; belly silvery. **Salarias periophthalmus Valenciennes**

11*b*. Dorsal rays XIII, 18 or 19; anal 21 or 22; arch of lateral line flat-topped, not extending to midaxis of body and ending at beginning of last fourth of spiny dorsal; a pair of tiny simple tentacles at nape; crest not developed; soft dorsal free from caudal; depth 4¾ to 5; head 4⅔; eye 3½ to 3¾ in head; pelvics 1¾ and longest soft dorsal ray 1⅓ in head; a very deep notch between dorsals; color pale, with light tan or brownish blotches on head and body or with seven obscure double bars ventrally, and single bars dorsally; most conspicuous color mark a black spot on membrane of spiny dorsal between tips of first two spines; lower lip blackish; dorsals, pectorals, caudal mostly plain in males but distinctly barred with spots in females; anal near tips blackish___ Salarias gibbifrons Quoy and Gaimard

10*b*. Cirri on eye not simple, but bifid or trifid at tips, or edges fringed.

12*a*. Dorsal rays XII or XIII, 17 or 18; anal 19 to 21; peritoneum dusky; nasal cirri 1 to 3, short; cirri on eye as long or longer than eye, with edges fringed; no cirrus on nape; crest developed on both sexes; soft dorsal free from caudal; lateral line ends under middle of spiny dorsal without turning down to midaxis; depth 5⅕ to 5½; head 4⅓; eye 5 in head; pelvics 2⅕ in head, height of longest soft dorsal ray 1¼ to 1⅓ in head; color brown; spiny dorsal blackish, with five black blotches between first to sixth spines, soft dorsal blackish with numerous oblique black and white lines on females; margin of anal blackish; rays of caudal and pelvics blackish; cheeks of males with small brown spots; often a brownish blotch behind eye; in young and half-grown one to five black blotches between first six dorsal spines; no oblique black and white lines on soft dorsal; sides of body with 10 to 12 vertical brown bars, as wide as eye in adults, with narrow white line between them, but in young the white and dark bars about same width and arranged in pairs; also diffuse pigment area at base of pectoral; midbase of caudal fin with a diffuse blackish blotch in young and in some adults.

Salarias margaritatus (Kendall and Radcliffe)

12*b*. Dorsal rays XIII, 20 to 22, anal 22 to 24; peritoneum pale, with but a few pigment cells; nasal cirri short, multifid; cirrus on each eye long, tip bifid or trifid; cirri small, rarely present; crest developed as a low ridge on breeding males; soft dorsal free from caudal; arch of lateral line ends below end of spiny dorsal; depth 5½ to 5⅘; head 4¾; eye 4; pelvics 2⅕; longest soft dorsal 1⅔ in head; dorsal deeply notched; color brownish with about eight bars on body, 1½ times wider than light interspaces and extending on lower part of dorsals; a round black spot a little above midaxis of body under second or third soft dorsal ray, about size of pupil on large males but absent on young and on other adults; tips of spinous dorsal rays blackish at most sizes; pectoral crossed with four or five rows of small brown spots on rays; pelvics dusky; lower half of caudal much darker than upper half; anal dusky; top of head and body anteriorly with paler spots; as large as pupil, a few of these also on side of head and snout dorsally; a diffuse

pigmented area near middle of cheek and on some specimens three obscure darker cross bars on under side of head.
Salarias nitidus Günther

SALARIAS FASCIATUS (Bloch)

Blennius fasciatus Bloch, Naturgeschichte der ausländischen Fische, pt. 2, p. 110, pl. 162, fig. 1, 1786.

115430, Tutuila Island, reef at Alofau, June 3, 1939, 3 large specimens.
52193, Pago Pago, Samoa, Jordan and Kellogg, 11 specimens.

SALARIAS EDENTULUS (Bloch)

Blennius edentulus Bloch, in Schneider, Systema ichthlologiae, p. 172, 1801.

An examination of the type of *Salarias garmani* Jordan and Seale (U.S.N.M. No. 51792) indicates that it is the young of this species. There is little doubt in my mind that *Salarias rechingeri* Steindachner is also this species. Fowler refers it to the genus *Cirripectes*, but Steindachner says that there is a slight trace of a crest on the rear of the head. He does not mention a fringe as suggested by Fowler. The description of *Salarias sindonis* Jordan and Seale does not agree with the types in the jar numbered U.S.N.M. No. 51792. That number is incorrect for that is the type of *S. garmani* and its description agrees with No. 51792. The specimens in jar 51793 are the same species as 51792, and both are here referred to the species *S. edentulus.* I have not been able to locate the specimen from which figure 105, *S. sindonis*, in Jordan and Seale's publication, was drawn, and am unable to match that form with any material from that region at the present time.

115437, Tau Island, reef at Siulagi Point, June 27, 1939, 64 specimens.
115439, Rose Island, lagoon, June 12–20, 1939, 6 specimens.
115431, Swains Island, reef, May 3–9, 1939, 3 specimens.
115433, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 2 specimens.
115435, Tutuila Island, reef at Alofau, June 3, 1939, 40 specimens.
115440, Tutuila Island, Fagasa Bay, rock pools, June 5, 1939, 24 specimens.
115436, Canton Island, reef of widest channel, May 13, 1939, 7 specimens.
115438, Canton Island, reef at ocean, April 25–28, 1939, 69 specimens.
115434, Enderbury Island, reef, May 15–19, 1939, 64 specimens.
115441, Hull Island, reef, July 12–15, 1939, 26 specimens.
115432, Hull Island, channel, July 8–12, 1939, 23 specimens
52526, Apia, Samoa, Jordan and Kellogg, 23 specimens.
51792 (type of *S. garmani* Jordan and Seale), Pago Pago, Samoa, Jordan and Kellogg.
51793 (labeled as types of *S. sindonis* Jordan and Seale, but they are *S. garmani*), Samoa, Jordan and Kellogg, 20 specimens.

SALARIAS LINEATUS Valenciennes

Salarias lineatus Valenciennes, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 11, p. 314, 1836.

115428, Canton Island, reef of widest shallow channel, May 13, 1939, 3 specimens.

115426, Canton Island, channel and lagoon, April 24, 1939, 1 specimen.
115429, Canton Island, reef at ocean, April 25–28, 1939, 10 specimens.
115425, Swains Island, May 3–9, 1939, 3 specimens.
115424, Enderbury Island, May 15–19, 1939, 2 specimens.
115423, Hull Island, reef, July 12–15, 1939, 48 specimens.
115427, Hull Island, channel, July 8–12, 1939, 14 specimens.
52192, Apia, Samoa, Jordan and Kellogg, 3 specimens.

SALARIAS ALBOGUTTATUS Kner

Salarias alboguttatus KNER, Sitzb. Akad. Wiss. Wien, vol. 56, p. 724, pl. 4, fig. 4, 1867.

52465, Pago Pago, Samoa, Jordan and Kellogg, 4 specimens.

SALARIAS GUTTATUS Valenciennes

Salarias guttatus VALENCIENNES, *in* Cuvier and Valenciennes, Histoire Naturelle des poissons, vol. 11, p. 308, 1836.

52255, Apia, Samoa, Jordan and Kellogg, 1 specimen.

SALARIAS CAUDOLINEATUS Günther

Salarias caudolineatus GÜNTHER, Journ. Mus. Godeffroy, vol. 6, pt. 11, p. 209, pl. 116, fig. F, 1877.

115444, Tau Island, reef at Siulagi Point, June 27, 1939, 13 specimens.
115442, Tutuila Island, Fagasa Bay, rock pools, June 5, 1939, 2 specimens.
115443, Tutuila Island, reef at Alofau, June 3, 1939, 4 specimens.
52310, Apia, Samoa, Jordan and Kellogg, 4 specimens.

SALARIAS MARMORATUS (Bennett)

Blennius marmoratus BENNETT, Zool. Journ., vol. 4, p. 35, 1828.

115459, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 4 specimens.
115457, Tutuila Island, reef at Alofau, June 3, 1939, 3 specimens.
115456, Tutuila Island, Fagasa Bay, Rock pools, June 5, 1939, 7 specimens.
115450, Swains Island, reef, May 3–9, 1939, 14 specimens.
115452, Tau Island, reef at Siulagi Point, June 27, 1939, 103 specimens.
115449, Enderbury Island, reef, May 15–19, 1939, 20 specimens.
115451, Canton Island, lagoon, May 23–25, 1939, 3 specimens.
115455, Canton Island, reef of widest shallow channel, May 13, 1939, 3 specimens.
115453, Canton Island, reef at ocean, April 25–28, 1939, 27 specimens.
115448, Canton Island, lagoon at deep channel, April 24, 1939, 1 specimen.
115458, Rose Island, reef, June 11–14, 1939, 5 specimens.
115454, Hull Island, channel, July 8–12, 1939, 5 specimens.
52264, Pago Pago, Samoa, Jordan and Kellogg, 1 specimen.

SALARIAS THALASSINUS (Jordan and Seale)

Alticus thalassinus JORDAN and SEALE, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 425, fig. 103, 1906.

115479, Swains Island, reef, May 3–9, 1939, 33 specimens.
115476, Tau Island, reef at Siulagi Point, June 27, 1939, 3 specimens.
115478, Tutuila Island, Fagasa Bay, rock pools, June 5, 1939, 20 specimens.
115480, Enderbury Island, reef, May 15–19, 1939, 3 specimens.

115477, Hull Island, channel, July 7–17, 1939, 1 specimen.

116173, Hull Island, reef, July 12–15, 1939, 1 specimen.

51795 (type of *Alticus thalassinus* Jordan and Seale), male, Apia, Samoa, Jordan and Kellogg.

51790 (type and cotype of *Alticus musilae* Jordan and Seale), females, Samoa, Jordan and Kellogg.

SALARIAS ANEITENSIS Günther

Salarias aneitensis GÜNTHER, Journ. Mus. Godeffroy, vol. 6, pt. 11, p. 205, pl. 118, fig. A, 1877.

115474, Tutuila Island, Fagasa Bay, rock pools, June 5, 1939, 35 specimens (tiny young and adults).

115475, Tau Island, reef at Siulagi Pt., June 27, 1939, 8 specimens. The largest one of these measures 124 mm. standard length.

51791 (type of *Salarias atkinsoni* Jordan and Seale), Apia, Samoa, Jordan and Kellogg.

SALARIAS PERIOPHTHALMUS Valenciennes

Salarias periophthalmus VALENCIENNES, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 11, p. 311, pl. 328, 1836.

115471, Swains Island, reef, May 3–9, 1939, 94 specimens.

115469, Enderbury Island, reef, May 15–19, 1939, 80 specimens.

115466, Tutuila Island, reef at Alofau, June 3, 1939, 12 specimens.

115472, Tau Island, reef at Siulagi Point, June 27, 1939, 43 specimens.

115465, Rose Island, lagoon, June 12–20, 1939, 2 specimens.

115473, Rose Island, reef, June 11–14, 1939, 116 specimens.

115462, Canton Island, lagoon among coral heads, May 23–25, 1939, 57 specimens.

115461, Canton Island, reef at ocean, April 25–28, 1939, 76 specimens.

115464, Canton Island, lagoon, April 23 to May 12, 1939, 14 specimens.

115463, Canton Island, reef of widest shallow channel, May 13, 1939, 84 specimens.

115460, Hull Island, channel, July 8–12, 1939, 340 specimens.

115470, Hull Island, reef, July 12–15, 1939, 57 specimens.

115467, Hull Island, channel, July 7–17, 1939, 10 specimens.

115468, Hull Island, shallow tide pool on reef, July 13, 1939, 27 specimens.

52307, Apia, Samoa, Jordan and Kellogg, 5 specimens.

SALARIAS GIBBIFRONS Quoy and Gaimard

Salarias gibbifrons QUOY and GAIMARD, Voyage autour du monde . . . *Uranie*, Zool., p. 253, 1824.

115420, Enderbury Island, reef, May 15–19, 1939, 53 specimens.

115422, Swains Island, reef, May 3–9, 1939, 90 specimens.

115419, Hull Island, reef, July 12–15, 1939, 34 specimens.

115421, Hull Island, channel, July 7–17, 1939, 29 specimens.

SALARIAS MARGARITATUS (Kendall and Radcliffe)

Alticus margaritatus KENDALL and RADCLIFFE, Mem. Mus. Comp. Zool., vol. 35, p. 137, pl. 7, fig. 3, pl. 8, fig. 1, 1912.

115483, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 6 specimens.

115482, Tutuila Island, reef at Alofau, June 3, 1939, 10 specimens.

115484, Tutuila Island, Fagasa Bay, rock pools, June 5, 1939, 7 specimens.

115481, Tau Island, reef at Siulagi Point, June 27, 1939, 114 specimens.

65409 (2 types of *Alticus margaritatus* Kendall and Radcliffe), Pago Pago, Samoa, *Albatross*.

SALARIAS NITIDUS Günther

Salarias nitidus GÜNTHER, Catalogue of the Fishes of British Museum, vol. 3, p. 243, 1861.

An examination of the types of *Alticus evermanni* and specimens collected by me and others in the National Museum indicates that *Alticus evermanni* Jordan and Seale represents the breeding males of *Salarias nitidus* Günther and that *Salarias coronatus* Günther includes the females of this same species.

115485, Tau Island, reef at Siulagi Point, June 27, 1939, 3 specimens.

51789 (5 cotypes of *Alticus evermanni* Jordan and Seale), Apia, Samoa, Jordan and Kellogg.

52308, Apia, Samoa, Jordan and Kellogg, 4 specimens.

51794, Apia, Samoa, Jordan and Kellogg. I cannot agree with Fowler that this type of *S. bryani* Jordan and Seale is the young of *S. edentulus* because on *bryani* the peritoneum is nearly pale instead of black, and the pectoral has a row or two of black spots near its base instead of plain dusky as in *S. edentulus* on young. It probably belongs with *S. nitidus*, as my ample material indicates. Although the canines are not now present in *bryani*, they may have been, as the specimen is in very poor condition.

Genus ENNEAPTERYGIUS Rüppell

Enneapterygius RÜPPEL, Neue Wirbelthiere zu der Fauna von Abyssinien gehörig, p. 2, 1935. (Type, *Enneapterygius pusillus* Rüppell.)

KEY TO THE SPECIES OF ENNEAPTERYGIUS FROM THE PHOENIX AND SAMOAN ISLANDS

1*a*. Number of scales with pores in anterior lateral line 22 to 27; anterior lateral line with a downward curve (concave) under pectoral fin, then extending almost along midaxis of body, ending near origin of third dorsal fin, oblique scale rows on side of body from upper edge of gill opening to base of caudal fin 39 or 43; color plain pale or with lower sides of head pigmented, this extending on base of pectoral fin rays; pectoral fin rays sometimes barred; sometimes traces of pigment on first two dorsals, especially along tips of rays of second dorsal; on a few specimens sides of body with traces of several pigmented areas or bars. See table 32 for fin-ray counts.

Enneapterygius hudsoni Jordan and Seale

1*b*. Number of scales with pores in anterior lateral line fewer than 20, usually 12 to 19; number of oblique scale rows on side of body from upper edge of gill opening to base of caudal fin rays 32 to 35.

2*a*. Number of pores in anterior lateral line 12 or 13; lateral line convex, curved over pectoral fin and ending under middle of second dorsal; dorsal rays III–X to XII–8 or 9; anal rays I, 15 to 17, color variable, but usually pectoral crossed with three or four bars, some specimens nearly pale---------------------- Enneapterygius minutus (Günther)

2*b*. Number of pores in anterior lateral line 16 to 19; pectoral fin plain pale; lateral line with a slight convex curve that is, with a slight upward curve over pectoral fin; dorsal rays III–XIII–9 to 11 (rarely 10 or 11); anal rays I, 18; color plain pale or with lower half of head blackish, black pigment on base of pectoral does not extend on rays; tail often blackish-------- Enneapterygius hemimelas (Kner and Steindachner)

ENNEAPTERYGIUS HUDSONI Jordan and Seale

Enneapterygius hudsoni Jordan and Seale, Bull. U. S. Bur. Fish., vol. 25 (1905), p. 419, fig. 101, 1906.

115514, Enderbury Island, reef, May 15–19, 1939, 19 specimens.
115513, Rose Island, reef, June 11–14, 1939, 1 specimen.
115515, Hull Island, channel, July 7–17, 1939, 5 specimens.
115517, Tutuila Island, reef at Alofau, June 3, 1939, 1 specimen.
115516, Hull Island, reef, July 12 to 15, 1939, 24 specimens.
115519, Tau Island, reef at Siulagi Point, June 27, 1939, 1 specimen.
115518, Tutuila Island, Fagasa Bay, rock pools, June 5, 1939, 6 specimens.
51798 (type of *Enneapterygius hudsoni* Jordan and Seale), Pago Pago, Samoa, Jordan and Kellogg.

ENNEAPTERYGIUS MINUTUS (Günther)

Tripterigium minutus Günther, Journ. Mus. Godeffroy, vol. 6, pt. 11, p. 211, pl. 118, fig. D, 1877.

115529, Tutuila Island, reef at Alofau, June 3, 1939, 3 specimens.
115530, Tau Island, reef at Siulagi Point, June 27, 1939, 9 specimens.
115528, Tutuila Island, Fagasa Bay, rock pools, June 5, 1939, 1 specimen.
51800 (5 types of *Enneapterygius tusitalae* Jordan and Seale), Apia, Samoa, Jordan and Kellogg.
51801 (2 types of *Enneapterygius tutuilae* Jordan and Seale), Pago Pago, Samoa, Jordan and Kellogg.
51799 (7 types of *Enneapterygius pardochir* Jordan and Seale), Pago Pago, Samoa, Jordan and Kellogg.
52246, Apia, Samoa, Jordan and Kellogg, 1 specimen.

ENNEAPTERYGIUS HEMIMELAS (Kner and Steindachner)

Tripterygium hemimelas Kner and Steindachner, Sitzb. Akad. Wiss. Wien, vol. 54, pt. 1, p. 371, 1866.

115526, Hull Island, reef, July 12–15, 1939, 30 specimens.
115521, Hull Island, channel, July 8–12, 1939, 1 specimen.
115524, Tau Island, reef at Siulagi Point, June 27, 1939, 6 specimens.
115520, Hull Island, channel, July 7–17, 1939, 6 specimens.
115522, Rose Island, reef, June 11–14, 1939, 5 specimens.
115525, Enderbury Island, reef, May 15–19, 1939, 5 specimens.
115527, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 1 specimen.
115523, Tutuila Island, Fagasa Bay, rock pools, June 5, 1939, 4 specimens.
51082 (type of *Enneapterygius cerasinus* Jordan and Seale), Apia, Samoa, Jordan and Kellogg.
52267, Pago Pago, Samoa, Jordan and Kellogg, 3 specimens.

TABLE 32.—*Counts made on various species of* Enneapterygius

Species	Dorsal rays										Anal rays							Pectoral fin rays		
	III	X	IX	XII	XIII	XIV	8	9	10	11	I	15	16	17	18	19	20	14	15	16
hemimelas	9	---	---	1	8	---	---	7	---	2	9	---	---	1	8	---	---	---	2	4
minutus	15	3	10	2	---	---	6	9	---	---	13	4	6	3	---	---	---	3	1	---
hudsoni	7	---	---	---	2	5	---	---	5	2	7	---	---	---	1	5	1	---	---	5

Species	Scales with pores in anterior lateral line																Scale rows from upper edge of gill opening to base of caudal fin rays											
	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	32	33	34	35	36	37	38	39	40	41	42	43
hemimelas	---	---	---	---	2	3	4	---	---	---	---	---	---	---	---	---	---	---	5	1	---	---	---	---	---	---	---	---
minutus	3	8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2	2	1	---	---	---	---	---	---	---	---	---
hudsoni	---	---	---	---	---	---	---	---	---	---	3	1	---	---	2	1	---	---	---	---	---	---	---	3	1	---	---	1

Family CARAPIDAE

Genus JORDANICUS Gilbert

Jordanicus GILBERT, Bull. U. S. Fish Comm., vol. 23 (1903), pt. 2, p. 656, 1905. (Type, *Fierasfer umbratilis* Jordan and Evermann.)

JORDANICUS GRACILIS (Bleeker)

Oxybeles gracilis BLEEKER, Nat. Tijdschr. Ned. Ind., vol. 11, p. 105, 1856.

115402, Tau Island, reef at Siulagi Point, June 27, 1939, 1 specimen, 217 mm. in total length.

Genus CARAPUS Rafinesque

Carapus RAFINESQUE, Indice d'ittiologia siciliana . . ., pp. 37, 57, 1810. (Type, *Gymnotus acus* Linnaeus.)

CARAPUS sp. juv.

115399, Tau Island, reef at Siulagi Point, June 27, 1939, 1 specimen, 177 mm. in total length.

115400, Tutuila Island, reef at Alofau, June 3, 1939, 1 specimen, 192 mm. in total length.

Family BROTULIDAE

Genus DINEMATICHTHYS Bleeker

Dinematichthys BLEEKER, Nat. Tijdschr. Ned. Ind., vol. 8, pp. 306, 319, 1855. (Type, *Dinematichthys iluocoeteoides* Bleeker.)

DINEMATICHTHYS ILUOCOETEOIDES Bleeker

Dinematichthys iluocoeteoides BLEEKER, Nat. Tijdschr. Ned. Ind., vol. 8, p. 319, 1855.

115398, Tau Island, reef at Siulagi Point, June 27, 1939, 66 specimens.

115397, Rose Island, reef, June 11–14, 1939, 2 specimens.

115394, Tutuila, Fagasa Bay, rock pools, June 5, 1939, 7 specimens.
115393, Swains Island reef, May 3–9, 1939, 10 specimens.
115392, Hull Island, reef, July 12–15, 1939, 2 specimens.
115396, Tutuila Island, reef at Alofau, June 3, 1939, 1 specimen.
115395, Enderbury Island, reef, May 15–19, 1939, 1 specimen.

One specimen counted has 80 dorsal rays; 64 anal; 21 pectoral; scale rows 107; gill rakers 2+1+12.

Several of the males have a remarkable copulatory organ, consisting of a long spine curved forward, the base of which is attached to a saclike gland; a duct leads from the testes to this gland; surrounding the spine anteriorly and laterally is a cartilaginous copulatory holding organ, which consists of a few rather complicated bony units.

Several of the females are gravid; one contained 108 embryos and numerous eggs in the tip of one wing of the ovary-uterus not developing. These embryos were eyed and about 2 mm. long.

Genus BROTULA Cuvier

Brotula Cuvier, Règne animal, ed. 2, vol. 2, p. 335, 1829. (Type, *Enchelyopus barbatus* Bloch and Schneider.)

BROTULA MULLERI Günther

Brotula mulleri Günther, Journ. Mus. Godeffroy, vol. 3, p. 334, 1909.

115401, Hull Island reef, July 12–15, 1939, 1 specimen.

With some uncertainty I identify this one specimen, 58 mm. in total length, as *B. mulleri.* I count 123 dorsal rays and 103 anal rays; the greatest depth of the body is 1½ in the head and 7¾ times in the total length; the head is contained 4¾ times in the total length; length of pectoral ½ head; eye equal to snout; interorbital space about ½ eye; the maxillary reaches to under rear edge of pupil; the dorsal and anal fins are brownish black in alcohol with the outer margin white and the basal part of the fin paler; on the cheek back of the eye are 15 to 19 pigment spots; numerous pigment spots are scattered along the body under the anterior part of the dorsal fin and larger ones on the side of the body posteriorly, these in two or three irregular rows.

Order XENOPTERYGII

Family GOBIESOCIDAE

Genus ASPASMAGASTER Waite

Crepidogaster Günther, Catalogue of the fishes of the British Museum, vol. 3, p. 507, 1861. (Type, *Crepidogaster tasmaniensis* Günther; name preoccupied, replaced by *Aspasmagaster* Waite, Rec. Austr. Mus., vol. 4, p. 315, 1907.)

ASPASMAGASTER SAMOENSIS (Steindachner)

Crepidogaster samoensis Steindachner, Sitzb. Akad. Wiss. Wien, vol. 115, pt. 1, p. 40, 1906.

115403, Tutuila Island, Fagasa Bay, rock pools, June 5, 1939, 1 specimen.

Order PLECTOGNATHI

Family BALISTIDAE

KEY TO THE GENERA AND SPECIES OF BALISTIDAE FOUND IN THE PHOENIX AND SAMOAN ISLANDS

1*a*. Gill slit surrounded by ordinary scales similar to those on head and trunk, each scale on trunk posteriorly and on caudal peduncle with a spine or somewhat enlarged tubercle, other scales very rough; ground color of trunk and head very dark or brownish everywhere marked with round pale spots; spinous dorsal brownish; other vertical fins brownish with obscure pale spots; pectoral pale; head about 3 to 3½ and depth 2½ to 24 to 26; anal 22 to 24; pectoral 14; scales about 45.
Canthidermis maculatus (Bloch)

1*b*. Gill opening with a few enlarged bony plates posteriorly, just above base of pectoral fin.

2*a*. Caudal peduncle with two rows of about three strong spines each, the area around these jet black, anal rays about 22 or 23; dorsal III–26 or 27; pectoral 13; scales on side of body 37 to 41; ground color of body blackish, with pale streaks curving around base of soft dorsal in wider and wider circles across body the last extending from about eye near base of pectoral to anal fin base; lower lip with white bar; a pale line across snout extends to below base of pectoral; a wider pale band across snout and one across chin pass backward and join below and in front of base of pectoral fin; pectoral, soft dorsal and anal pale; caudal fin pale-dusky, the upper and lower edges margined with a black line; spinous dorsal blackish; snout about 3½ in standard length________________________________ **Balistes undulatus** Mungo Park

2*b*. Caudal peduncle not as in 2*a* above.

3*a*. Mandible protrudes so that chin is in advance of tip of upper jaw; three or four naked blue streaks on head extending from below mouth to above base of pectoral; scales on posterior ventral side of body with slight tubercles, but no spines on caudal peduncle; ground color grayish, center of each scale brownish and edges of each scale brownish, making weak oblique lines; spinous dorsal brown; pectoral, soft dorsal, and anal fins pale except their scaly base, which is brownish; caudal fin dusky its margin whitish; dorsal rays about III–29; anal 26 or 27; scale rows on side of body about 35.
Balistes ringens Linnaeus

3*b*. Mandible not protruding so that chin projects in front of tip of jaw; no naked grooves or streaks across the head as in 3*a* above.

4*a*. Caudal peduncle without spines; anal rays about 28, dorsal III–33; pectoral 14; scale rows on side of body about 68; color of head and trunk plain black; pectoral pale; caudal fin pale the edges of upper and lower sides with a black line; soft dorsal and anal margined with a narrow black band; snout in standard length 4½.
Balistes vidua Richardson

4*b*. Caudal peduncle with spines or tubercles on center of at least some of scales.

5*a*. Scales on side of trunk and on caudal peduncle with weak spines or turbercles; ground color pale, brownish above, abdomen paler; mouth with a narrow blue circular band around it from which a blue streak extends to below pectorals and sometimes to anal origin; a narrow blackish band from spinous dorsal through eye, thence curving to lower edge of pectoral fin base; above pectoral base a small black area with a narrow band extending part way up to middle of base of spinous dorsal; pubic spine and ventral flap with dark brown margin; pectoral, soft dorsal and anal fins pale; caudal pale dusky; dorsal rays about III–27 or 28, anal 25 or 26; scale rows on side of body about 54______ **Balistes bursa Bloch**

5*b*. Scales on anterior portion of trunk without spines or tubercles at their centers, those on midside of caudal peduncle and adjoining region just anteriorly with enlarged spines arranged in definite rows.

6*a*. Caudal peduncle with four or five rows of moderately strong spines, the three middle rows, with about seven to nine spines, about equal in length and strength of spines; area around these spines with a triangular black patch, its base forming a black ring around caudal peduncle; anal rays about 21; dorsal III–23 to 25; pectoral 13; scale rows on side of body 37 to 40; ground color of head and trunk pale; a black band on interorbital passes through eye, thence widens as it passes to base of pectoral and behind it to anus and anterior two-thirds of base of anal fin; upper edge of this patch and edges of triangular patch on caudal peduncle pale (reddish in life); a pale line (reddish in life) extends from near middle third of upper edge of black patch to posterior base of soft dorsal; pectoral, soft dorsal, and anal fins pale; caudal fin pale dusky; membranes of spinous dorsal blackish; snout about three times in standard length__________________________ **Balistes rectangulus Bloch**

6*b*. Spines on the side area of caudal peduncle region not contained in a definite black triangular patch.

7*a*. Caudal peduncle with three rows of strong, black spines, upper two rows of about equal length, but lower row of about four or five spines about half length of upper; anal rays about 21 to 23; dorsal III–24 or 25; pectoral 13 or 14; scale rows on side of body 39 to 44; ground color of body dusky above, white below, with a blue-bordered or pale-bordered black band from interorbital through eye to pectoral base, latter with a black ring; anus black; a black patch with diffuse edges extending from base of pectoral to origin of soft dorsal, thence backward to caudal peduncle, but interrupted below anterior half of soft dorsal by a pale triangular area; from black patch a black band extending downward and back toward anus, then a black line followed by a black band toward anal fin, these bands sometimes fading out before reaching the ventral line; blue band across snout; pectoral, soft dorsal, and anal pale; spiny dorsal blackish; caudal fin dusky; a ring of yellowish around snout and chin, connected

with a band that extends to below the pectoral fin base, fading posteriorly; snout 2⅔ in standard length.
Balistes aculeatus Linnaeus

7b. Caudal peduncle region with 5 to 10 rows of spines on each side

8a. Caudal peduncle with about five or six rows of short spines, the three or four middle ones of about same length and strength of spines; ground color of trunk slaty brown, paler below, abdomen whitish; chin and lower lip whitish; a pale streak across snout thence backward toward base of pectoral; top of head with light spots, sides of head and trunk with centers of scales dark brownish; soft dorsal with pale edge then a submarginal dark brown band, rest of fin pale except basal portion, which is dark brown; anal and caudal fins similar, except that basal portion of caudal fin has a very dark brown transverse band; dorsal rays about III–26; anal 24; pectoral 14, scales about 37.
Balistes flavimarginatus Rüppell

8b. Caudal peduncle region with from 7 to 10 rows of small spines; anal rays about 25; dorsal III–27; pectoral 13; scale rows on side of body about 49; color of head and trunk brownish, lips pale; chin with two pale cross bands, one below lower lip and other on under side of chin; pectoral dusky; caudal fin with white crescent shaped band along its posterior margin, upper and lower edges with white band, rest of fin blackish; soft dorsal and caudal pale dusky, the bases of the rays darker; snout in standard length 3½________________ **Balistes chrysopterus Bloch**

Genus CANTHIDERMIS Swainson

Canthidermis SWAINSON, The natural history and classification of fishes, amphibians, and reptiles, or monocardian animals, vol. 2, p. 325, 1839. (Type, *Balistes angulosus* Quoy and Gaimard.)

CANTHIDERMIS MACULATUS (Bloch)

Balistes maculatus BLOCH, Naturgeschichte der ausländischen Fische, pt. 2, p. 25, pl. 151, 1786.

The relationship of *C. maculatus* and *C. rotundatus* is not understood by me, and since we do not have adequate specimens for their separation and the literature concerning them does not clear up the matter satisfactorily, I am using the oldest name. Only one species of this type appears to occur in the region under consideration. There are no specimens in National Museum from the Phoenix or Samoan Islands.

Genus BALISTES Linnaeus

Balistes LINNAEUS, Systema naturae, ed. 10, vol. 1, p. 327, 1758. (Type, *Balistes vetula* Linnaeus.)

BALISTES UNDULATUS Mungo Park

Balistes undulatus MUNGO PARK, Trans. Linn. Soc. London, vol. 3, p. 37, 1797.

115074, Tutuila Island, reef at Alofau, June 3, 1939, 1 specimen.

115971, Tutuila Island, reef at Pagai, June 4, 1939, L. P. Schultz and Frank Taiga, 2 specimens.

115072, Tutuila Island, reef at entrance of Pago Pago Bay, June 2, 1939, 1 specimen.

115070, Hull Island, channel, July 8–12, 1939, 1 specimen.

115073, Enderbury Island reef, May 15–19, 1939, 1 specimen.

115069, Hull Island, channel, July 7–17, 1939, 2 specimens.

41554, Samoan Islands, 1889, Dr. C. H. White, U. S. N., 1 specimen.

52351, Apia, Samoa, Jordan and Kellogg, 5 specimens.

BALISTES RINGENS Linnaeus

Balistes ringens Linnaeus, Systema naturae, ed. 10, vol. 1, p. 329, 1758.

No specimen in National Museum from the Phoenix or Samoan Islands.

BALISTES VIDUA Richardson

Balistes vidua Richardson, The zoology of the voyage of H. M. S. *Sulphur*, Fishes, p. 128, pl. 59, figs. 9–10, 1844.

52451, Pago Pago, Samoa, Jordan and Kellogg, 1 specimen.

BALISTES BURSA Bloch

Balistes bursa Bloch, *in* Schneider, Systema ichthyologiae . . ., p. 476, 1801.

No specimen in the National Museum from the Phoenix or Samoan Islands.

BALISTES RECTANGULUS Bloch

Balistes rectangulus Bloch, *in* Schneider, Systema ichthyologiae . . ., p. 462, 1801 (type locality: Indian Ocean) (on *Le Baliste echarpe* Lacepède, Histoire naturelle des poissons, vol. 1, pp. 333, 352, pl. 16, fig. 1, 1799).

115075, Rose Island reef, June 11–14, 1939, 8 specimens.

115082, Hull Island, channel, July 7–17, 1939, 1 specimen.

115076, Canton Island, reef on ocean side, April 25–28, 1939, 2 specimens.

115077, Swains Island reef, May 3–9, 1939, 1 specimen.

115078, Tau Island, reef at Siulagi Point, June 27, 1939, 1 specimen.

115081, Enderbury Island reef, May 15–19, 1939, 2 specimens.

115080, Hull Island reef July 12–15, 1939, 1 specimen.

115079, Hull Island channel, July 8–12, 1939, 1 specimen.

52353, Apia, Samoa, Jordan and Kellogg, 3 specimens.

BALISTES ACULEATUS Linnaeus

Balistes aculeatus Linnaeus, Systema naturae, ed. 10, p. 328, 1758.

115083, Canton Island, reef in wide channel, May 13, 1939, 6 specimens.

115084, Canton Island lagoon coral heads, May 23–25, 1939, 4 specimens.

115086, Canton Island lagoon, May 25–26, 1939, 2 specimens.

115085, Hull Island channel, July 8–12, 1939, 2 specimens.

115088, Hull Island channel, July 7–17, 1939, 3 specimens.

115087, Tutuila Island, Cocoanut Point, June 4, 1939, 1 specimen.

15138, Samoan Islands, 1 specimen.

52329, Apia, Samoa, Jordan and Kellogg, 6 specimens.

82946, Samoa ?, Wilkes Exploring Expedition, 1 specimen.

BALISTES FLAVIMARGINATUS Rüppell

Balistes flavimarginatus RÜPPELL, Atlas zu der Reise im nördlichen Afrika, Fische, p. 33, 1828.

No specimen in National Museum from the Phoenix or Samoan Islands.

BALISTES CHRYSOPTERUS Bloch

Balistes chrysopterus BLOCH, in Schneider, Systema ichthyologicae . . . p. 466, 1801 (type locality: Indian Ocean) (based on *B. arme* of Lacepède, Histoire naturelle des poissons, vol. 1, p. 382, pl. 18, fig. 2, 1798).

52356, Apia, Samoa, Jordan and Kellogg, 1 specimen.

Family MONACANTHIDAE

Genus CANTHERINES Swainson

Cantherines SWAINSON, The natural history and classification of fishes, amphibians and reptiles, or monocardian animals, etc., vol. 2, p. 327, 1839. (Type, *Monacanthus nasutus* Quoy and Gaimard.)

CANTHERINES SANDWICHIENSIS (Quoy and Gaimard)

Balistes sandwichiensis QUOY and GAIMARD, Voyage autour du monde . . . *Uranie*, Zool., p. 214, 1824.

115303, Rose Island, reef, June 11–14, 1939, 7 specimens.

115305, Tutuila Island, reef at Alofau, June 3, 1939, 4 specimens.

115304, Tutuila Island, reef at Pagai, L. P. Schultz and Frank Taiga, 4 specimens.

52516, Apia, Samoa, Jordan and Kellog, 2 specimens.

Genus MONACANTHUS Oken

Monacanthus OKEN, Isis, 1817, p. 1183. (Type, *Balistes chinensis* Bloch.)

MONACANTHUS MELANOCEPHALUS Bleeker

Monacanthus melanocephalus BLEEKER, Nat. Tijdschr. Ned Ind., vol. 5, p. 95, 1853.

52336, Apia, Samoa, Jordan and Kellogg, 4 specimens.

Genus AMANSES Gray

Amanses GRAY, Illustrations of Indian zoology, vol. 2, p. 98, 1833. (Type, *Amanses hystrix* Gray = *Monacanthus scopas* Cuvier.)

AMANSES SCOPAS (Cuvier)

Acanthurus scopas CUVIER, Règne animal, vol. 2, p. 224, 1829 (on Renard, Poissons . . . isles Moluques . . ., vol. 1, pl. 40, fig. 210, 1718).

52205, Apia, Samoa, Jordan and Kellogg, 2 specimens.

Genus OXYMONACANTHUS Bleeker

Oxymonacanthus BLEEKER, Ned. Tijdschr. Dierk., vol. 3, p. 16, 1866. [Type, *Oxymonacanthus chrysospilus* Bleeker (= *Balistes longirostris* Bloch.)]

OXYMONACANTHUS LONGIROSTRIS (Bloch)

Balistes hispidus var. *longirostris* Bloch, in Schneider, Systema ichthyologiae . . ., p. 464, 1801 (on Seba, Locupletissimi rerum naturalium thesauri . . ., vol. 3, p. 20, fig. 19, 1758).

52292, Apia, Samoa, Jordan and Kellogg, 4 specimens.

Family OSTRACIIDAE

Genus OSTRACION Linnaeus

Ostracion Linnaeus, Systema naturae, ed. 10, p. 330, 1758. (Type, *Ostracion cubicus* Linnaeus.)

OSTRACION CUBICUS Linnaeus

Ostracion cubicus Linnaeus, Systema naturae, ed. 10, p. 332, 1758.

52335, Apia, Samoa, Jordan and Kellogg, 3 specimens.

OSTRACION SEBAE Bleeker

Ostracium sebae Bleeker, Nat. Tijdschr. Ned. Ind., vol. 2, p. 259, 1851.

52331, Apia, Samoa, Jordan and Kellogg, 2 specimens.

OSTRACION LENTIGINOSUM Bloch

Ostracion lentiginosus Bloch, *in* Schneider, Systema Ichthyologiae . . ., p. 501, 1801.

115302, Rose Island reef, June 11–14, 1939, 2 specimens.

Family TETRAODONTIDAE

Genus TETRAODON Linnaeus

Tetraodon Linnaeus, Systema naturae, ed. 10, p. 332, 1758. (Type, *Tetraodon lineatus* Bloch, as restricted by Bonaparte in Iconographia della fauna italica.)

TETRAODON NIGROPUNCTATUS Bloch

Tetraodon nigropunctatus Bloch, *in* Schneider, Systema ichthyologiae . . ., p. 507, 1801.

115299, Rose Island, reef, June 11–14, 1939, 1 specimen.
115300, Tutuila Island, reef at Alofau, June 3, 1939, 2 specimens.
52499 Pago Pago, Samoa, Jordan and Kellogg, 4 specimens.

TETRAODON HISPIDUS Linnaeus

Tetraodon hispidus Linnaeus, Systema naturae, ed. 10, p. 333, 1758.

115301, Tutuila Island, reef at Alofau, June 3, 1939, 1 specimen.
52466, Apia, Samo, Jordan and Kellogg, 1 specimen.

TETRAODON IMMACULATUS Bloch

Tetraodon immaculatus Bloch, *in* Schneider, Systema Ichthyologiae . . ., p. 507, 1801 (on Lacépède, Histoire naturelle des poissons, vol. 1, p. 486, pl. 24, fig. 1, 1798).

52517, Apia, Samoa, Jordan and Kellogg, 3 specimens.

Genus CANTHIGASTER Swainson

Canthigaster SWAINSON, The natural history of fishes, amphibians and reptiles, or monocardian animals, vol. 2, p. 194, 1839. (Type, *Tetraodon rostratus* Bloch.)

CANTHIGASTER BENNETTI (Bleeker)

Tropidichthys bennetti BLEEKER, Nat. Tijdschr. Ned. Ind., vol. 6, p. 504, 1854.

115298, Rose Island, reef, June 11–14, 1939, 1 specimen.

CANTHIGASTER SOLANDRI (Richardson)

Tetrodon solandri RICHARDSON, The zoology of the voyage of H. M. S. *Sulphur*, Fishes, p. 125, pl. 57, figs. 4–6, 1845.

115296, Tutuila Island, rock pools at Fagasa Bay, June 5, 1939, 13 specimens.
115295, Rose Island, lagoon, June 12 to 20, 1939, 1 specimen.
115294, Hull Island, reef, July 12–15, 1939, 2 specimens.
115297, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 3 specimens.
52339, Apia, Samoa, Jordan and Kellogg, 7 specimens.

CANTHIGASTER AMBOINENSIS (Bleeker)

Psilonotus amboinensis BLEEKER, Ned. Tijdschr. Dierk., vol. 2, p. 180, 1865.

115292, Rose Island, reef, June 11–14, 1939, 2 specimens.
115291, Tutuila Island, rock pools at Fagasa Bay, 2 specimens.
52338, Apia, Samoa, Jordan and Kellogg, 1 specimen.
117312, Pago Pago, Samoa Jordan and Kellogg, 1 specimen.

Genus SPHEROIDES Duméril

Spheroides (Lacepède) DUMÉRIL, Zoologie analytique . . ., p. 342, 1806. (Type, "Le Spheroide tubercule.")

SPHEROIDES HYPSELOGENION (Bleeker)

Tetraodon hypselogenion BLEEKER, Nat. Tijdschr. Ned., Ind., vol. 3, p. 300, 1852.

52337, Apia, Samoa, Jordan and Kellogg, 2 specimens.

Family DIODONTIDAE

Genus DIODON Linnaeus

Diodon LINNAEUS, Systema naturae, ed. 10, vol. 1, p. 334, 1758. (Type, *Diodon hystrix* Linnaeus.)

DIODON HOLOCANTHUS Linnaeus

Diodon holocanthus LINNAEUS, Systema naturae, ed. 10, p. 335, 1758.

115289, Tutuila Island, reef at entrance Pago Pago Bay, June 2, 1939, 1 specimen.
115288, Tutuila Island, reef at Alofau, June 3, 1939, 7 specimens.

DIODON HYSTRIX Linnaeus

Diodon hystrix LINNAEUS, Systema naturae, ed. 10, p. 335, 1758.

115290, Rose Island, reef, June 11–14, 1939, 2 specimens.

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